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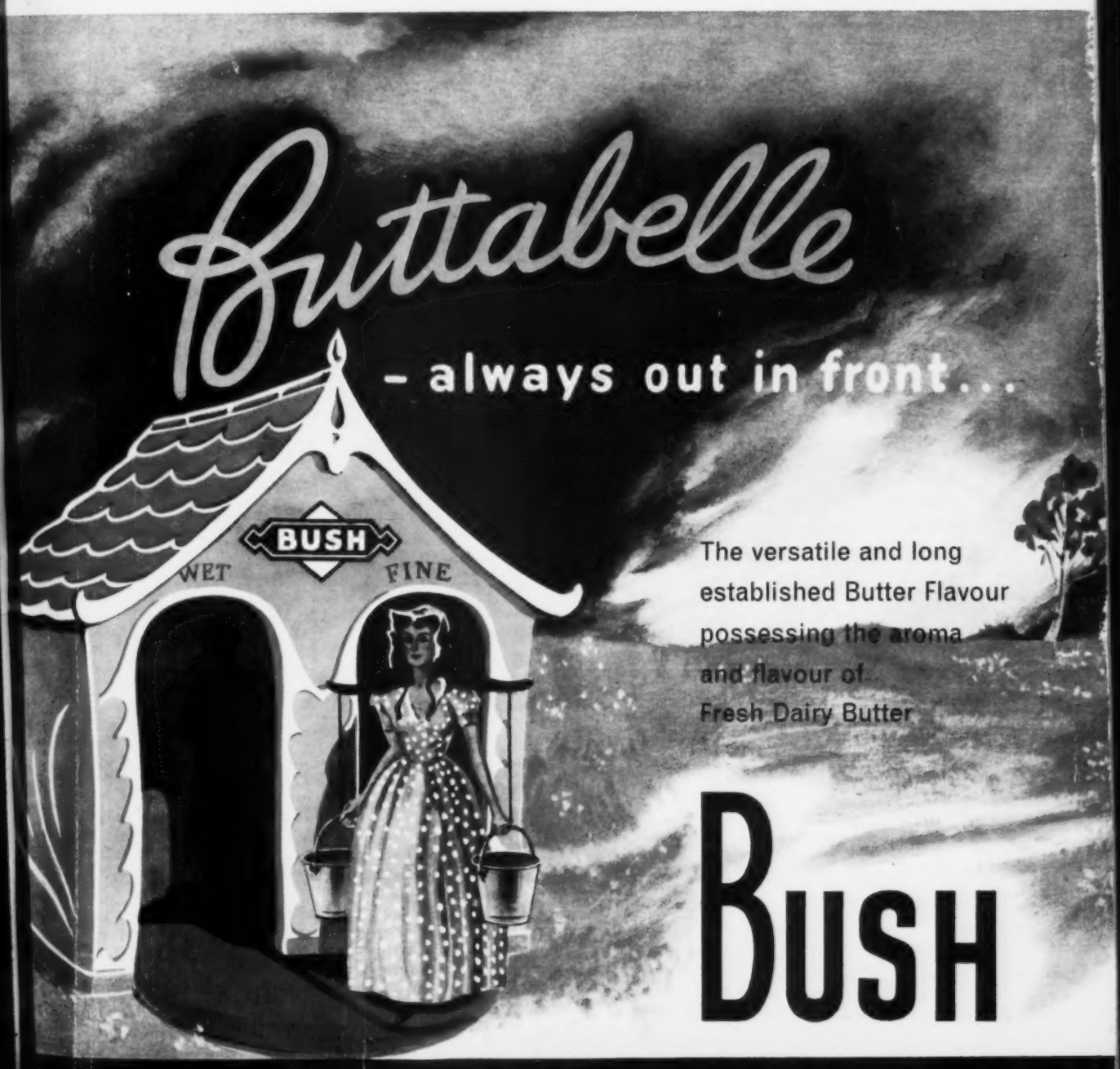
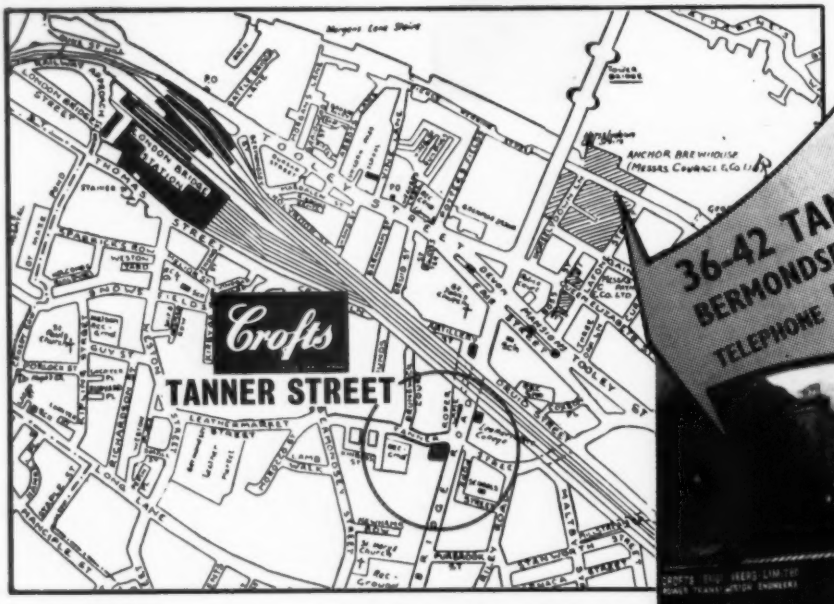
FOOD Manufacture

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP

Vol. 36 No. 11 NOVEMBER 1961





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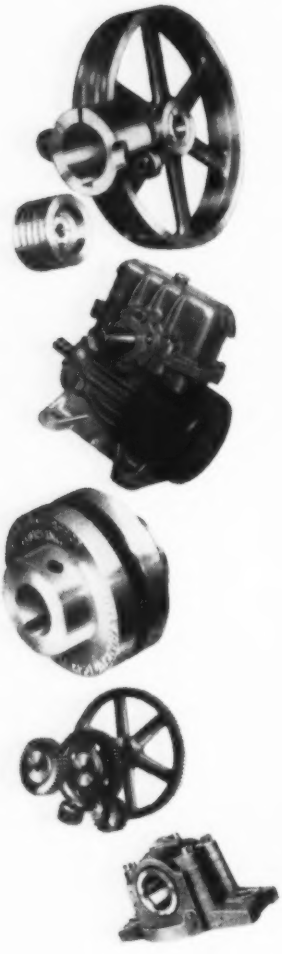

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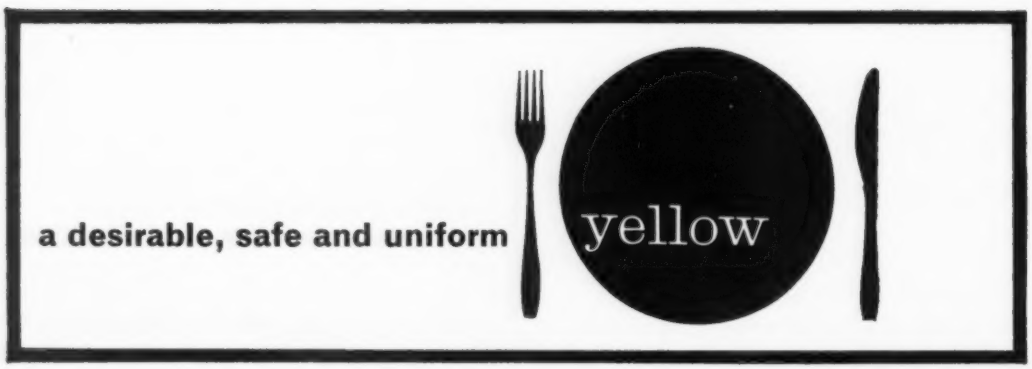

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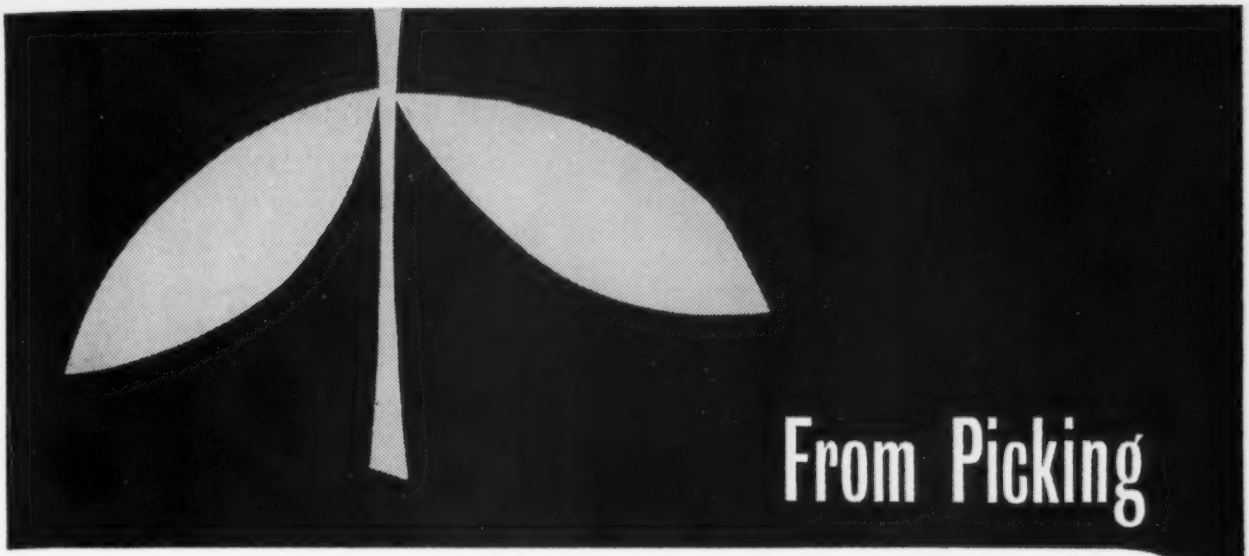

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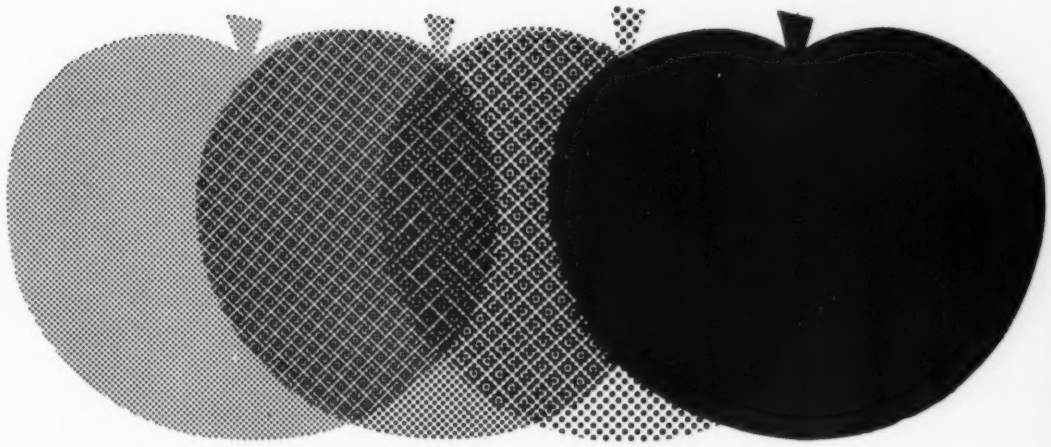

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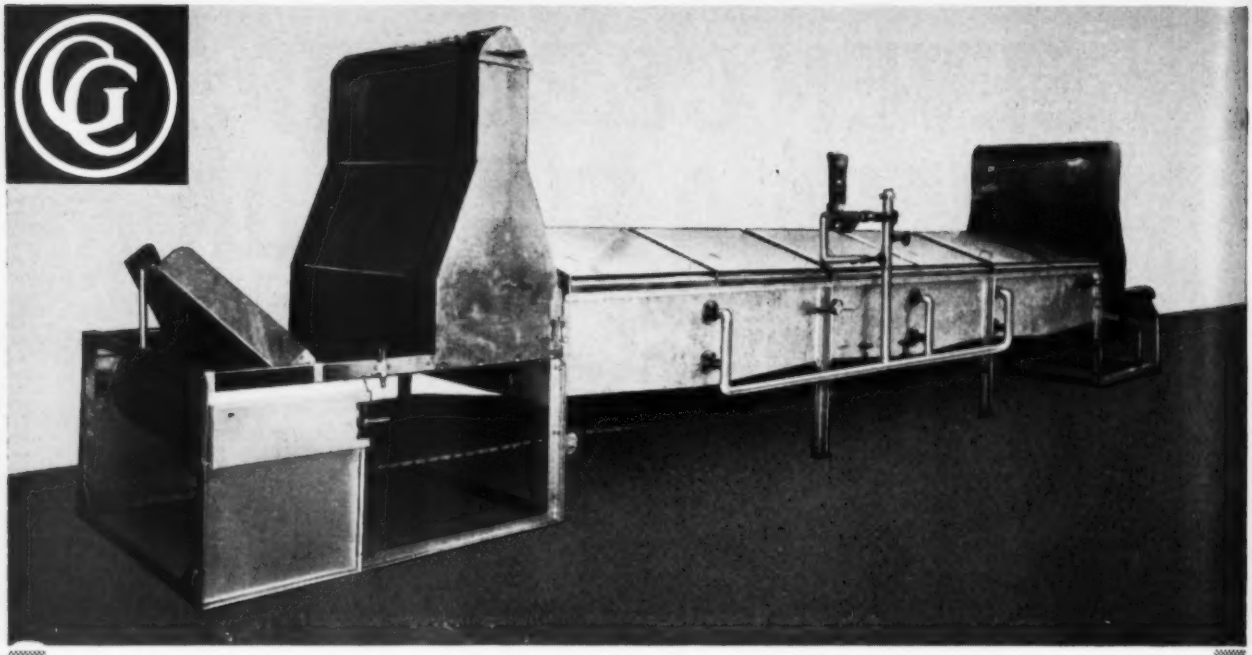

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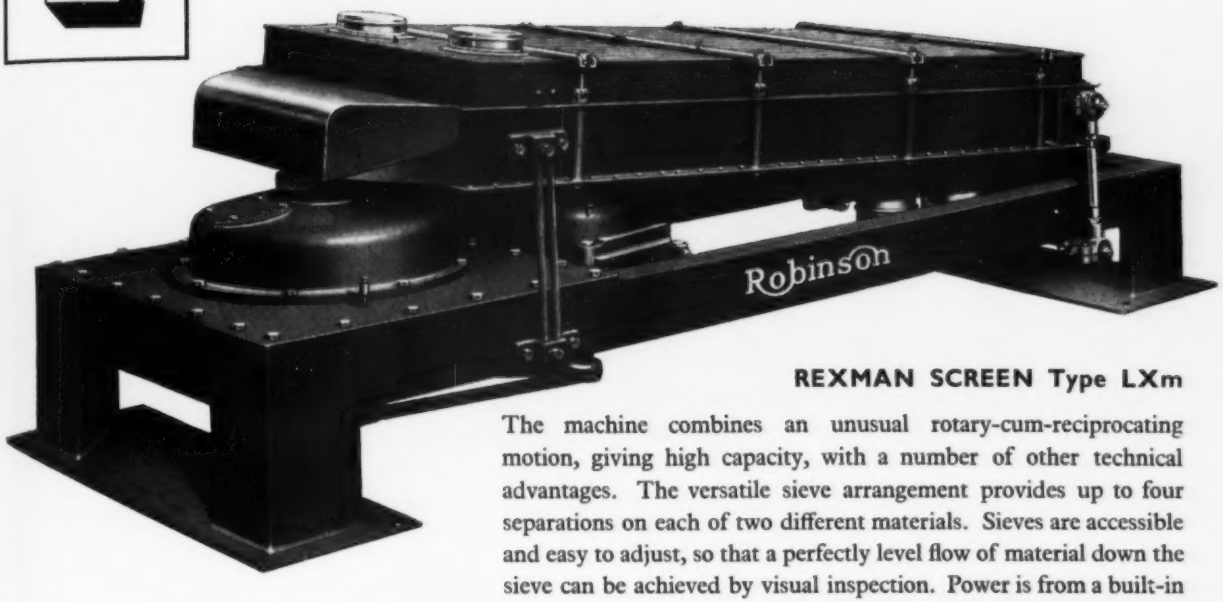

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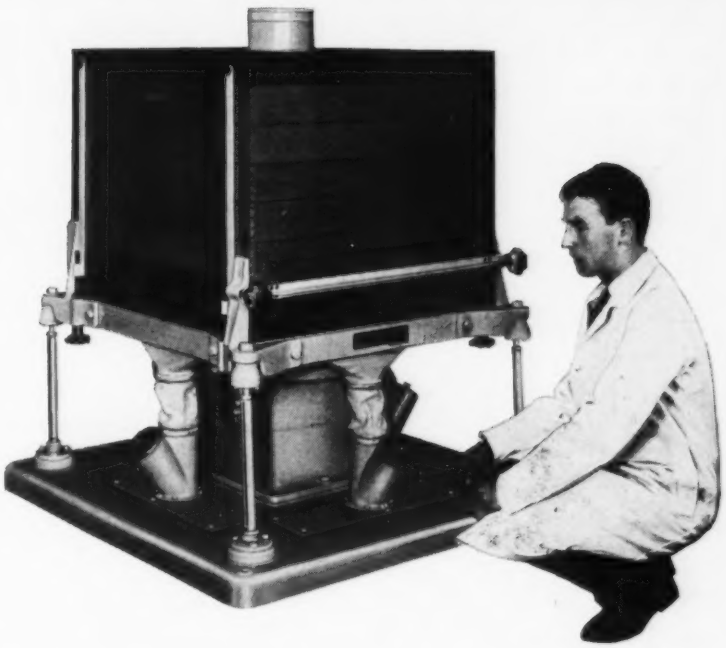

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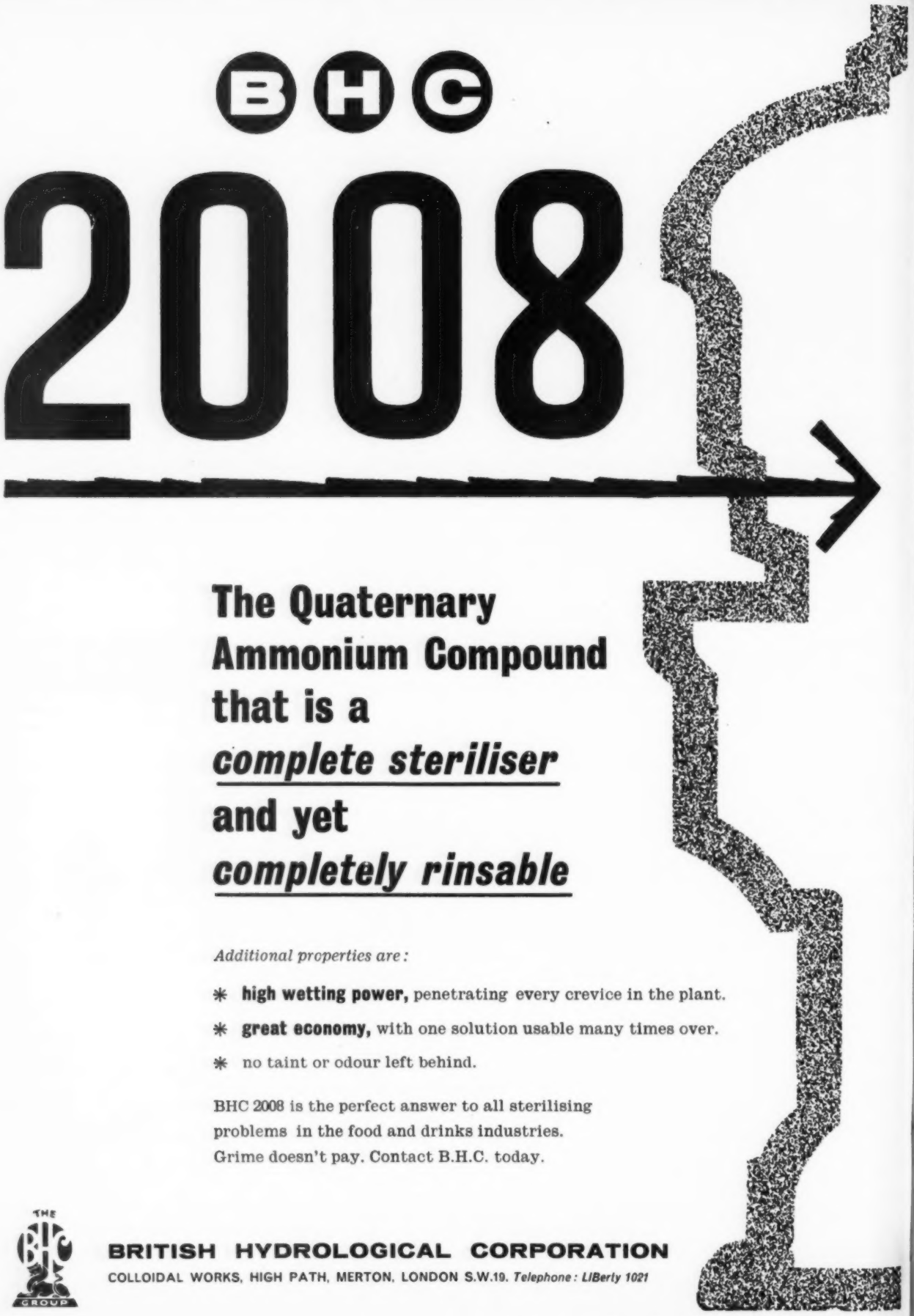

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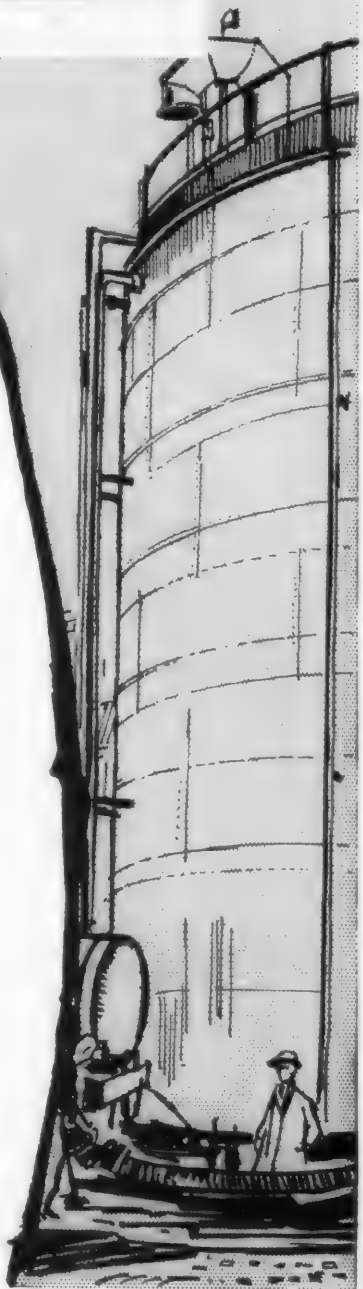

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TODAY

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Vickers laboratories are constantly extending the list of freeze-dried foods that can be effectively and profitably marketed. Invite Vickers engineers to examine the application of this new process to your business.

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South Marston Works Swindon England *Telephone Stratton St. Margaret 3241*

In addition to Accelerated Freeze Drying Plant, Vickers-Armstrongs (South Marston) Limited are working on technically advanced government and industrial engineering contracts for the General Post Office, the United Kingdom Atomic Energy Authority, the British Transport Commission and the War Office. The Company's design departments renowned in many fields, are at work on Food Processing Plant, Linear Accelerators for Radiotherapy, Radiation Sterilisation Equipment, Hovercraft, Nuclear Research, and Nuclear Training Equipment.

MEMBER COMPANY OF THE VICKERS GROUP

VN20/4A

for

CONTINUOUS AND AUTOMATIC SEPARATION

of

LIQUIDS AND SOLIDS

with

INCREASED YIELDS AND HIGHER EFFICIENCY

Modernise with

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Send for our bulletin 'A guide to Modern Centrifugals'

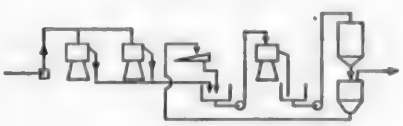
De Laval Continuous Catalyst Separator

CENTRIFUGAL SEPARATORS

. . . round and round the clock separating liquids and solids with the minimum manpower . . . . round and round the clock giving the highest degree of separation or clarification in processing chemicals, pharmaceuticals, drinks, food products, soaps, detergents and oils.

De Laval has up-to-the-minute answers to your problem with a modern range of separators — self-cleaning, continuous solids discharge, conveyor or rotary screen type machines.

FROM A SINGLE MACHINE TO A COMPLETE CONTINUOUS PROCESS



De Laval also offers complete plants:

* 'Centriflow' Animal Fat Rendering
* 'Centripure' Continuous Soap Plants
* 'Centrifish' Fish Reduction Plants
* 'Short Mix' refining plants for vegetable oils
* Starch plants
* Pasteurisation and Keg beer plants

Process Engineering Division
ALFA-LAVAL CO LTD · GREAT WEST ROAD · BRENTFORD · MIDDX
Telephone: Isleworth 1221

Smee's DL456

...but in your competitive world of food palates have to be tempted

As the variety of packed and canned foods increases, selling *your* product becomes that much more difficult. The answer is to make your product that much more attractive. Three products are at your command which can transform ordinary savoury foods into something quite irresistible. These products are PROTEX ... YEATEX ... AJI-NO-MOTO. Ask us for samples. We have a free experimental kitchen service, too, which might interest you.

Protex

is the hydrolised protein that imparts a rich, meaty flavour —the finest possible base for meat flavoured products.

Yeatex

is the finest of all Yeast Extracts, and quite marvellous for imparting to food a delicate flavour and aroma.

Aji-no-moto

is a unique product (Monosodium Glutamate 99% pure) which draws out hidden flavour and puts new life into a weak flavour. Economical in use.

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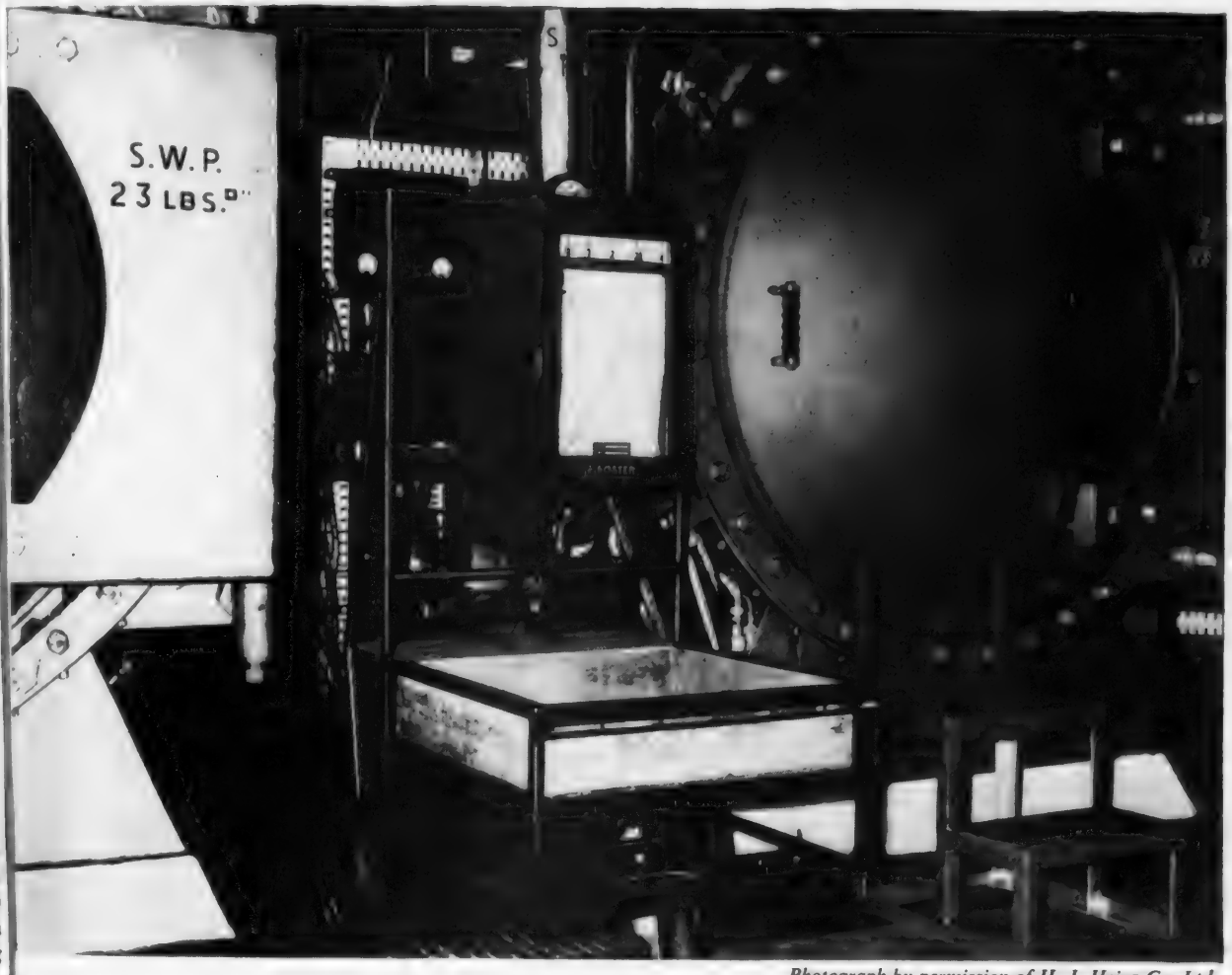
Sterilization of CANNED FOOD products

Proper sterilization of food in sealed containers is based on the principle that the product must be heated to such temperatures and to such times as is necessary to destroy the spores in the very centre of the product. We manufacture and supply a special range of temperature measuring equipment for this process.



Photograph by permission of H. J. Heinz Co. Ltd.

For full details contact :

RESILIA **FOSTER**

for temperature measurement and control

FOSTER INSTRUMENT CO. LTD., LETCHWORTH, HERTS., ENGLAND

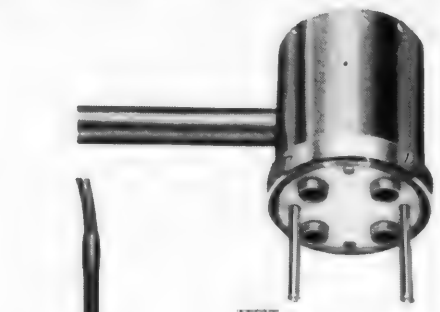
Members of B.I.M.C.A.M., S.I.M.A. and S.I.R.A. · Telephone: Letchworth 984-5-6 · Telegrams: Resilia, Letchworth

A PRECISION ELECTRIC THERMOMETER *DESIGNED* FOR FOOD MANUFACTURE CONTROL AND RESEARCH

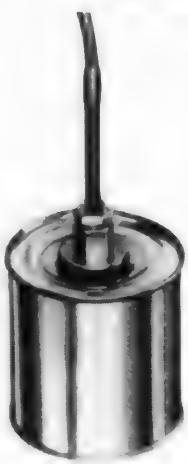
The TEC electric precision thermometer is used by some of the largest tinned food manufacturers in the country, and has many vital advantages which ensure greater accuracy *plus* easier operation.

The thermometer will register up to fifteen applicators at one time, allowing a direct reading. Battery operated, it has automatic compensation for room temperature and a normal range of 0—130°C.

Applicators can be inserted before or after filling and sealing without the use of solder. Types are available for side or end entry into can.

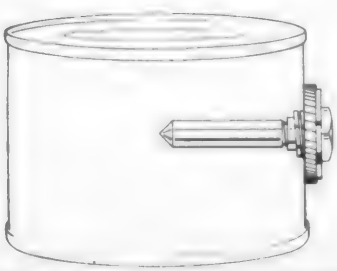


ABOVE
Special slipring contact for introducing four applicators into a revolving autoclave.



LEFT
Normal applicator for end entry in tin.

BELOW
Side entry applicator. Can also be used in vacuum sealed tins.



Fruit & Vegetable Canning & Quick Freezing Research Association
Smedley's Ltd
Joseph Farrow & Co. Ltd
Crosse & Blackwell Ltd
The Co-operative Wholesale Society Ltd
(Milk and Milk Products Department)

Please write or telephone for further details

SIEREX LTD

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Telephone: LANgham 2464

Refrigerated food cabinets made by Frozenaire Limited, Ten Bell Lane, Norwich, for the Norwich Co-operative Society Ltd., and on which 'Darvic' p.v.c. sheet has been used for the external cladding and some of the interior panelling.

'Darvic' cuts the cost of tailor-made Frozenaire display cabinets

These refrigerated cabinets were made to order by Frozenaire Ltd., Ten Bell Lane, Norwich, for branches of the Norwich Co-operative Society Ltd., Norwich. Although cabinets made to fit a particular shop in this way are usually expensive, because of the higher cost involved in making tailor-made cabinets instead of a standard production line, Frozenaire have managed to keep the cost of these down by using 'Darvic' p.v.c. sheet for panelling. No complicated, expensive moulds are necessary for shaping 'Darvic', which can also be cut, drilled and cemented to give neat joints – screws are not necessary, as 'Darvic' panels cut to shape can neatly be cemented to wooden frames. 'Darvic' is light in weight, which means cabinets faced with it are easy to move. No painting has to be done, since 'Darvic' can be supplied in a wide range of attractive colours.

The low thermal conductivity of 'Darvic', its high resistance to corrosion and, in most colours, its complete lack of toxicity in contact with foodstuffs, make it the ideal panelling inside as well as outside refrigerated units. It is also a very easy material to keep clean. Specify 'Darvic' p.v.c. sheet for hygienic panelling on walls, refrigerated cabinets, counters and shelves.

ICI 'DARVIC'

'Darvic' is the registered trade mark for the rigid p.v.c. sheet manufactured by I.C.I.

PD91

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

The new METIOR floating plug plug cock

This new stainless steel plug cock has a floating plug suspended between two compressed sealing rings. Their pressures on the plug are individually adjustable by rotating the top and bottom caps which are easily freed by a light tap with a rubber mallet. The joint rings can be supplied in P.T.F.E., rubber or neoprene. It gives full bore flow, will withstand pressures up to 60 p.s.i. and is designed for in-place cleaning. Four sizes are available 1″, 1½″, 2″ and 2½″, both two-way and three-way.

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OTHER PRODUCTS INCLUDE: STAINLESS, CARBON AND ALLOY STEEL TUBES · MACHINED COMPONENT PARTS · STAINLESS TUBE FITTINGS · BI-METAL TUBES · 'FORJEND' AND 'LT' WELDING FITTINGS · CARBON AND ALLOY DRAWN AND GROUND BARS AND WIRE · NUCLEAR COMPONENTS

TSW 838

DON'T
GET

THE FIRST COMPLETE **ALL-IN-ONE** SELF ADHESIVE LABELLING SYSTEM

look at this

You won't get it off your chest– or your desk!

It's a *Tickogrip* (the label that grips and stays put).

JUST ONE
of a full range of labels, window-stickers, etc., by Tickoply—the name that means today's smartest self-adhesive labelling.

TAKE ONE OFF
and press it to any firm surface– see how it sticks and sticks!

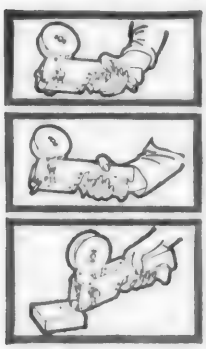
APPLY THE OTHER TO YOUR LETTER-PAPER
and mail to us today.

SELF ADHESIVE LABELLING

apply labels with this

It's called a 'MINI'.
It's the fantastic new 'baby' of a **FULL RANGE** of manual and electrically-controlled dispensers, applicators and overprinters by *Tickoply*—the name that means today's smartest self-adhesive labelling.

SEE HOW IT WORKS



1 PRINT
You squeeze the grip—the ticket is printed.

2 DISPENSE
You release the grip—the printed ticket is released for sticking on.

3 APPLY
You apply the 'gun' to the object's flat surface and pull down—PRESTO!

Tickoply Self-Adhesive Labels
Tickoply Dispensers
Tickoply Applicators
Tickoply Overprinters

Co[illegible]ge with this → **Tickoply**

TICKOPLY DIVISION, TICKOPRES LTD.,
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Telephone: CITy 5373/6

toy

THIS **FREE** DISPENSER CAN BE YOURS

either by playing the label game over-page or by completing and sending us the form below. This toy dispenser, loaded with self-adhesive labels, will give you a practical introduction to the

Tickoply SYSTEM

—absolutely the first, last and *only* word for miles and miles of the best labels . . . blank or ready-printed, mirror-glazed, gold foil, silver foil, day-glo, that will stay put or will remove easily, that can replace metal plates or will stick on fabrics . . . dispensed with blissful ease from the extensive range of *Tickoply* dispensers, applicators and overprinters.

FILL THIS SPACE YOURSELF

Please send FREE toy dispenser and full details of the COMPLETE TICKOPLY SYSTEM

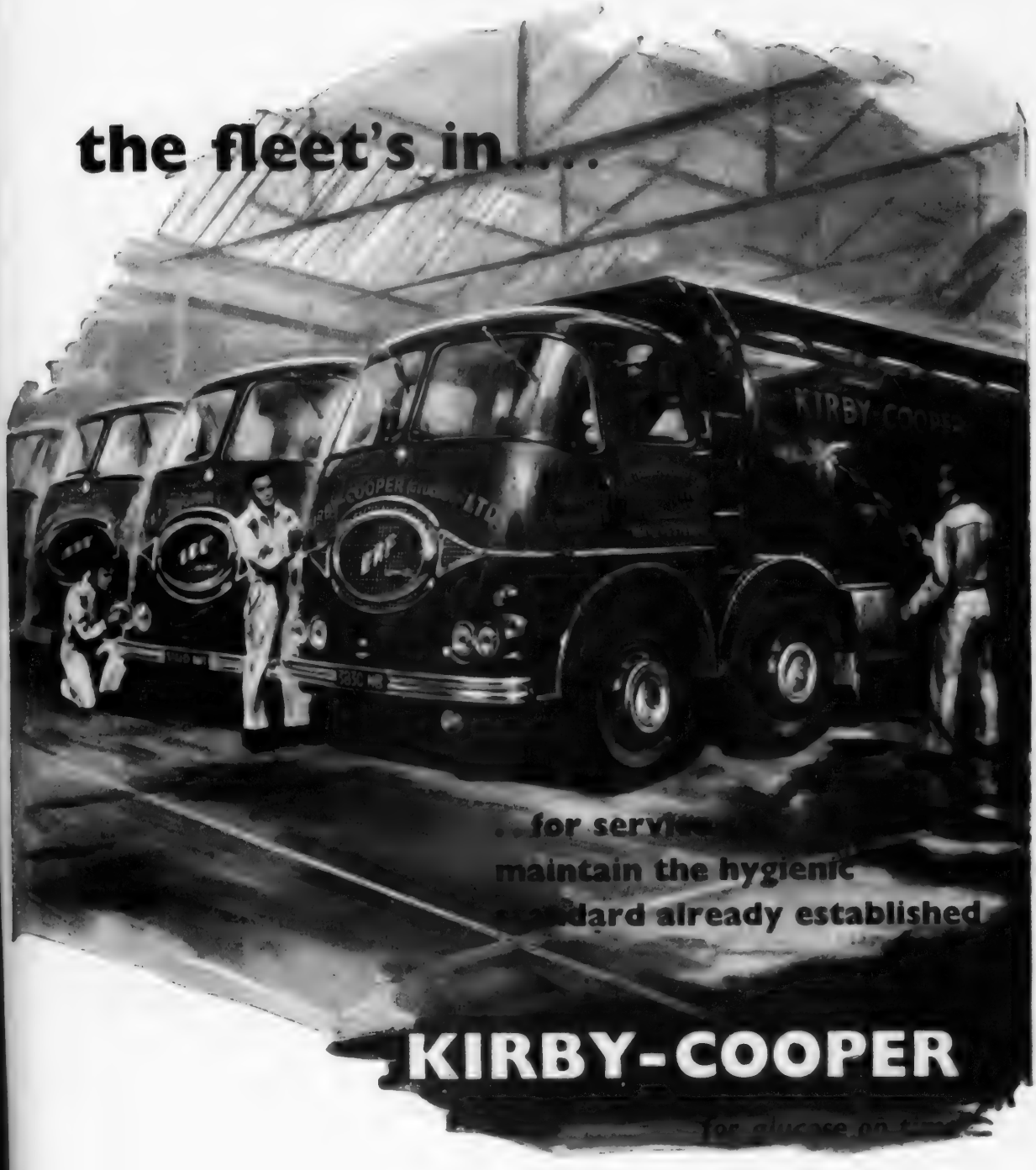
Name .....

Type of business .....

Address .....

.....

To: TICKOPLY DIVISION, TICKOPRES LTD.,
Head Office: 7-8 Old Bailey, London E.C.4.
Telephone: CITy 5373/6



* LIQUID GLUCOSE
* POWDERED GLUCOSE
* CORNFLOUR
* SPECIALITY STARCHES

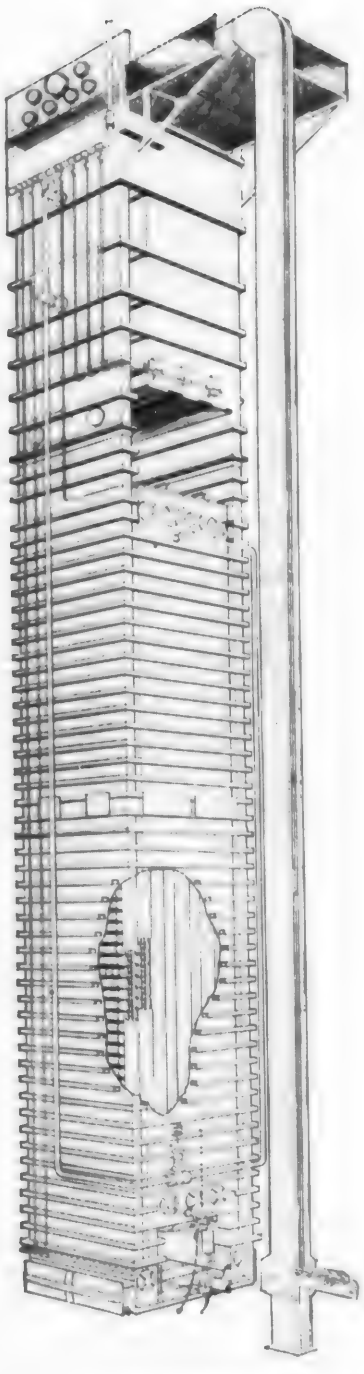
KIRBY-COOPER (GLUCOSE) LIMITED 21 FENNEL STREET MANCHESTER 4 TEL. DEANSGATE 6561

The **CARVALLO** *Hydrostatic*

STERILISER

manufactured under licence by

MATHER & PLATT LTD.



These are its advantages:

* **VERSATILITY** — Continuous sterilising of Vegetables, Meat Products, Fruits, Milk, etc., in cans, bottles or jars.

* **FLEXIBILITY** — Variable sterilisation temperature and time to suit each product.

* **SECURITY** — Throughout sterilisation and cooling, unit containers are totally enclosed in perforated steel carrier tubes. They cannot escape.

* **ECONOMY** — Contra-flow principle ensures great economy in steam and water. — Floor space occupied seldom exceeds 35 sq. ft. — Fully automatic operation and mechanical reliability allow remarkable economy in manpower.

* **RELIABILITY** — All moving and static parts are of great strength. All-welded chain of patented design with case hardened pins and bushes. No mechanical valves.

* **EASE OF MAINTENANCE.**—All moving parts readily accessible. Carrier tubes are not attached to the chains and are instantly removable for inspection.

* **EASE OF INSTALLATION** — The Carvallo Steriliser may be installed at floor level or in a pit according to circumstances.

There are over 50 Carvallo installations working in Europe alone.

There is a Carvallo Steriliser to meet your requirements - let us know what those requirements are.

Mather & Platt
LIMITED

FOOD MACHINERY DEPARTMENT
RADCLIFFE, MANCHESTER.
Telephone: RADcliffe 2641. Telegrams: Mather, Radcliffe, Manchester

London Office:
PARK HOUSE, 22 GREAT SMITH STREET, S.W.1.
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WASHTHOSETRAYSWELL

with Dawson WASHING PLANT

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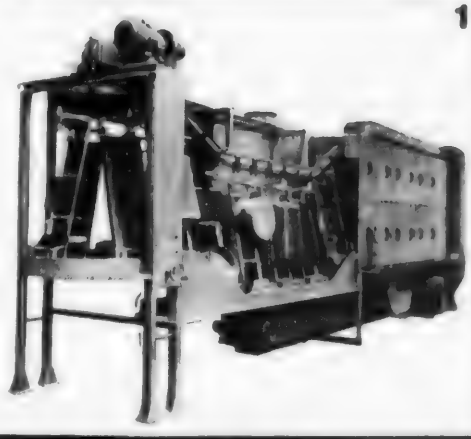
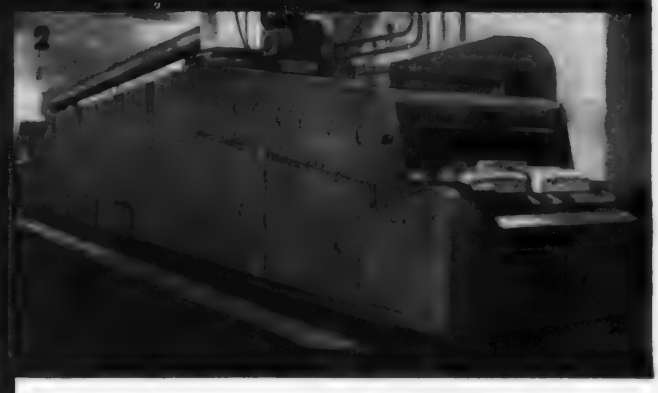
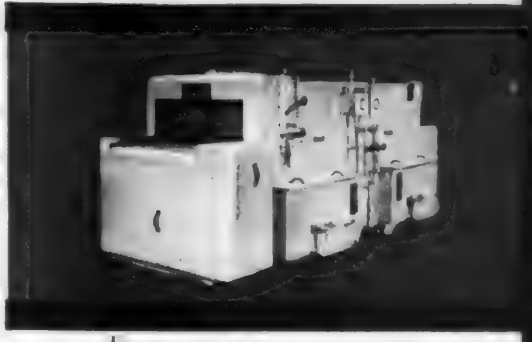
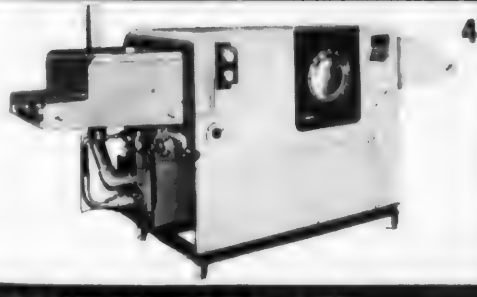
1









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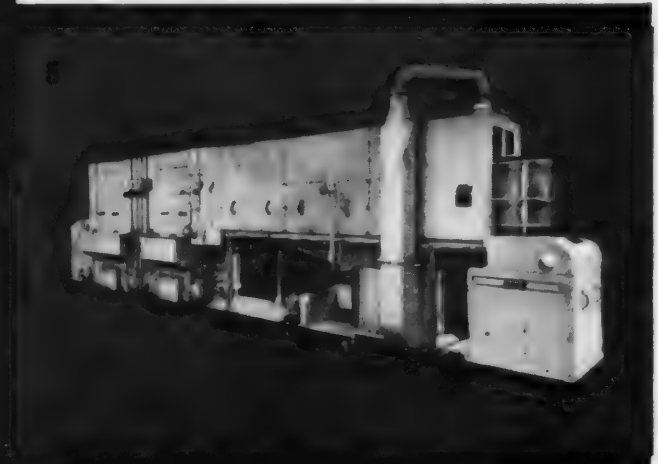

1 Monorail conveyor machine for washing, rinsing and drying an assortment of utensils at a large chocolate factory. Only one operator is required.

2 Large capacity washing and drying machine for a wide variety of aluminium containers used in the preparation of Perishable foods.

3 This is a very versatile model T.U. Tray and utensil cleaning machine.

4 This small, compact washing and rinsing machine cleans trays up to 24 in. wide at 450 ft. per hour

5 This floor space saving machine cleans bakers' trays on their ends. It is two wide and washes, rinses, sterilises and dries up to 1,000 trays per hour.

DAWSON BROS. LTD. Gomersal, Nr. Leeds Tel: Cleckheaton 3422 (7 lines)
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"Cellophane" multi-packs

display-value

Full six-sided visibility comes with a "Cellophane" film multi-pack. The retailer frequently puts these sparkling film show-cases straight onto his shelves, giving your products valuable display space at point-of-purchase.

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"Cellophane" film multi-packs give full protection against dirt, dust and damp, and, by clearly showing fragile contents, promote more careful handling. Particularly suitable for multi-packaging is MXXT/A "Cellophane" — gauge for gauge the most moistureproof packaging film in the world.

Let us tell you how multi-packaging in "Cellophane" film can improve your business. We shall be glad to make up specimen packs with your products and provide full details of costs and wrapping equipment—entirely without obligation, of course.

Get in touch with us today.

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Materials-cost alone is frequently less. And you save because no printing, labelling or adhesives are necessary. "Cellophane" film multi-packs are easily made up by hand or machine.

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Transparent multi-packs mean easier stock-control through instant recognition of nature, size and quantity of contents. "Cellophane" film is cleaner to handle and easier to dispose of too.

BRITISH CELLOPHANE LIMITED

Henrietta House, 9 Henrietta Place, London, W.1. Tel. MUSeum 8311

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

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BY THE SOLVENT EXCHANGE PROCESS

EXTRACTS

StaffordAllens Vanilla Extracts are pure extractives of the finest beans. For the true flavour of natural vanilla they are unsurpassed.

Samples will gladly be sent on request.

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WARCO ALUMINIUM EQUIPMENT

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Cat. No. SC 108 . . 2 galls. capacity
Cat. No. SC 1012 . . 3 galls. capacity
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WARWICK 'WARCO' ENGLAND
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VANTOC CL and AL
Ace agents for microbiological control.

VANTOC B
The perfect bactericidal rinse for drinking glasses.

VANTROPOL BQ
The best 2-in-1 detergent and bactericide.

LISSAPOL N and NDB
The most economical liquid cleansers for general cleaning purposes.

Full information on request :

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1 ENGLAND

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CLOSURE BY KORK-N-SEAL

for Miles Laboratories Limited

Kork-N-Seal make a wider variety of closures than any other British manufacturer, for glass, metal and plastic containers. They are part of United Glass Ltd., Britain's leading makers of glass containers, so your closures and glass containers can be produced and delivered together.

If you need closures, or expert advice on closures, come to Kork-N-Seal. You'll get the best service there is. Please write or 'phone.

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The Closure Division of United Glass Limited

KORK-N-SEAL LIMITED
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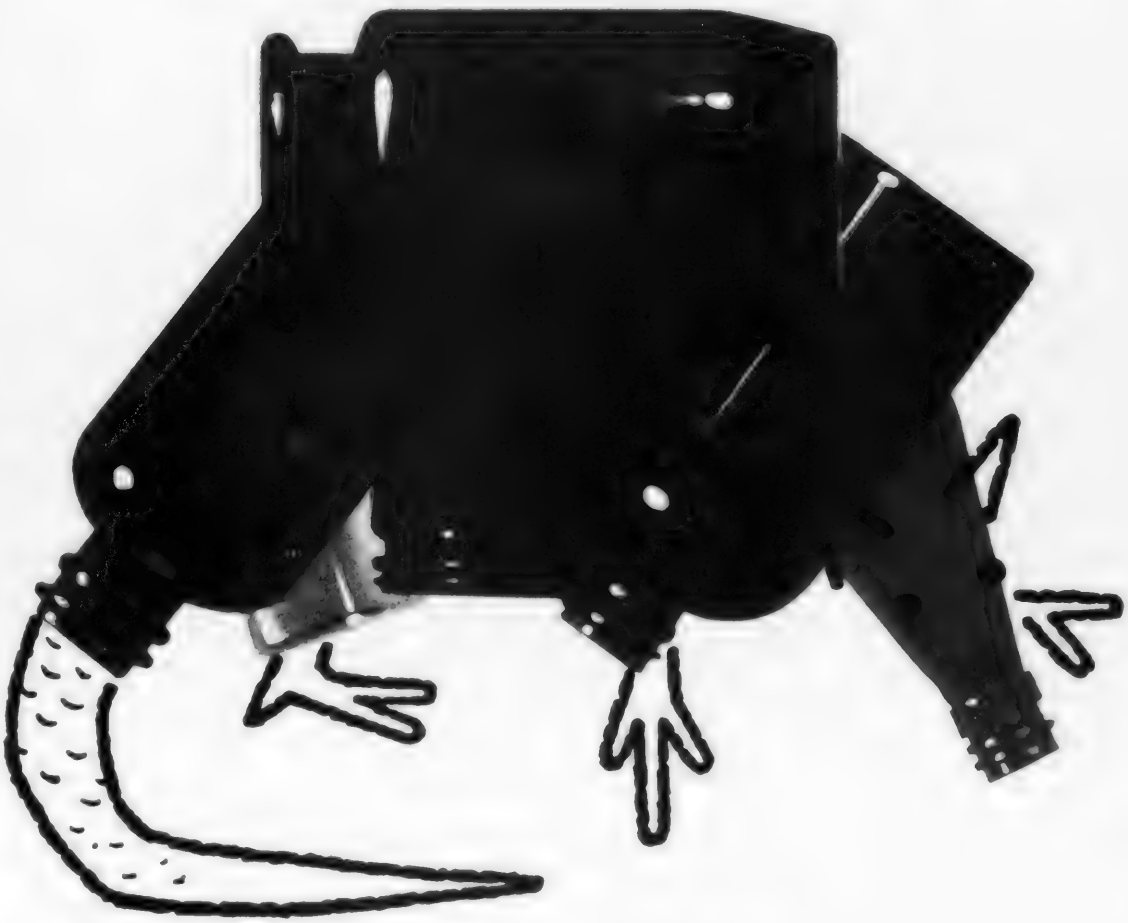
BIRDS AND BEASTS — BOTTLED BY UNITED GLASS



The Jarmadillo

GENUS: glassiensis. CHARACTERISTICS: a body that resists all chemical attack. PROVENANCE: United Glass, the place to go for the best glass packaging service.

- The finest in modern glass package design and research.
- Containers and closures made together to suit each other perfectly.
- Expert help and advice on any glass packaging problem.
- The right type of container for every kind of product.

Glass makes the finest containers of all — and United Glass makes them by the million. Let us know how we can help you.

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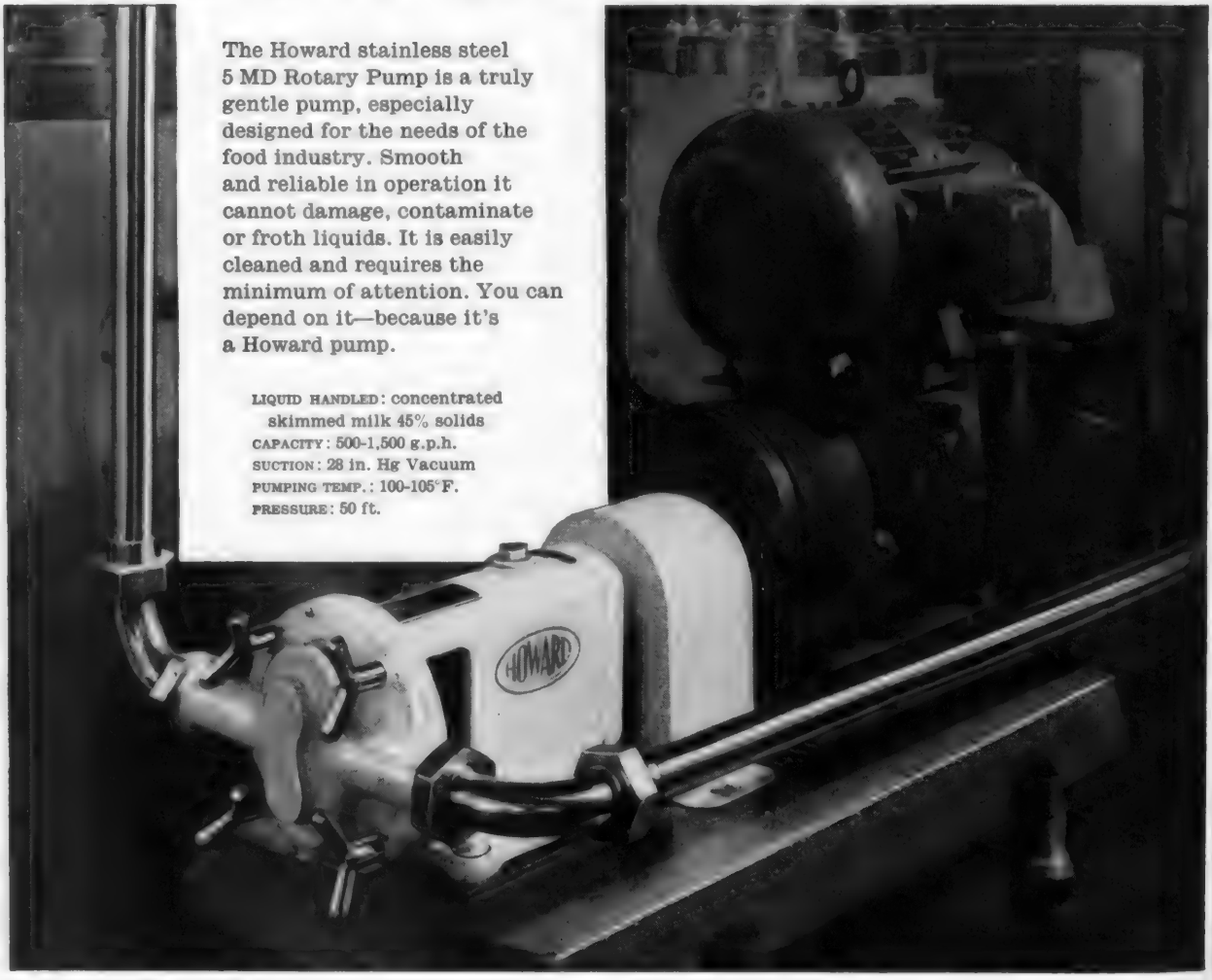
TELEPHONE: GERRARD 8611. TELEGRAMS: GLASPAK, LESQUARE, LONDON

They pump gently at Cow & Gate . . .



The Howard stainless steel 5 MD Rotary Pump is a truly gentle pump, especially designed for the needs of the food industry. Smooth and reliable in operation it cannot damage, contaminate or froth liquids. It is easily cleaned and requires the minimum of attention. You can depend on it—because it's a Howard pump.

LIQUID HANDLED: concentrated skimmed milk 45% solids
CAPACITY: 500-1,500 g.p.h.
SUCTION: 28 in. Hg Vacuum
PUMPING TEMP.: 100-105°F.
PRESSURE: 50 ft.

Photo by courtesy of Cow & Gate Ltd.

. . . and they pump with Howard

THE HOWARD PNEUMATIC ENGINEERING COMPANY LTD

Head Office & Works: FORT ROAD, EASTBOURNE, SUSSEX. *Telephone:* EASTBOURNE 4804/5.
Telegrams: HOWMATIC. *London Office:* TERMINAL HOUSE, GROSVENOR GARDENS, LONDON, S.W.1.

You can rely on Metal Box to find the one lamination that is really suited to your product—or to give you a choice, where that is possible. Sales appeal, maximum protection, machine handling properties are all most carefully considered. How is it done? Firstly by discussing the project with the trained and experienced field service men representing Metal Box Research. Behind these on-the-spot men there is the whole of Metal Box Research Division where the stored experience of many years often produces the quick answer to your *need;* or where the laboratories can reproduce all the conditions your pack is likely to meet. Whether it is six months in the jungle or twelve in the Antarctic—Metal Box can tell you how your pack is likely to behave. With the right material selected from the fully comprehensive Metal Box range there is in addition the design service to assist, and where appropriate a market information service too. Call in a Metal Box Plastics Group representative, for a 'start to finish' service—THE COMPLETE SERVICE.

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The Plastics Group of The Metal Box Company Limited
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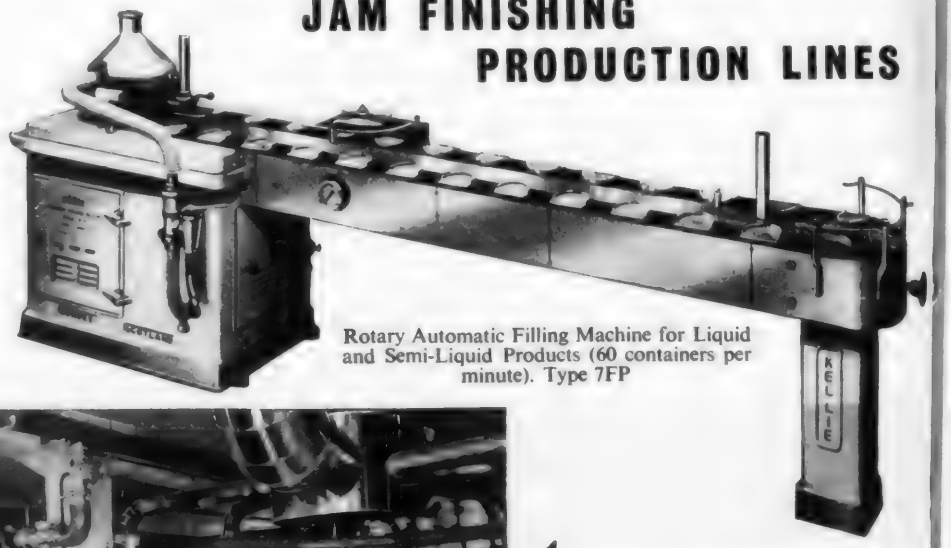
OF DUNDEE

pioneers in FULLY AUTOMATIC

JAM FINISHING PRODUCTION LINES

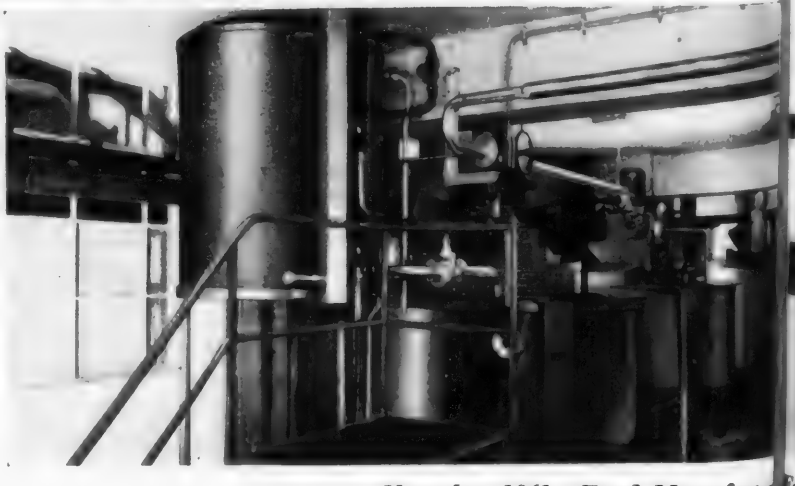


Rotary Automatic Filling Machine for Liquid and Semi-Liquid Products (60 containers per minute). Type 7FP

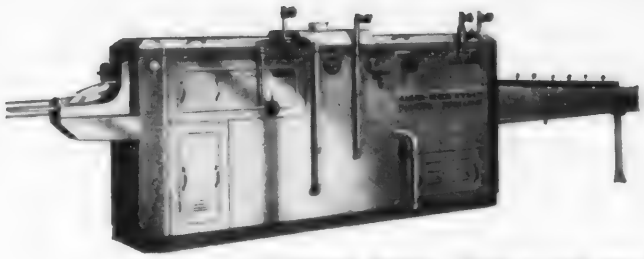
4 Batteries of Rapid Boiling Pans installed in German Preserve Factory.

A Battery of Water Calibrating and Sugar Tanks for Jam Processing.

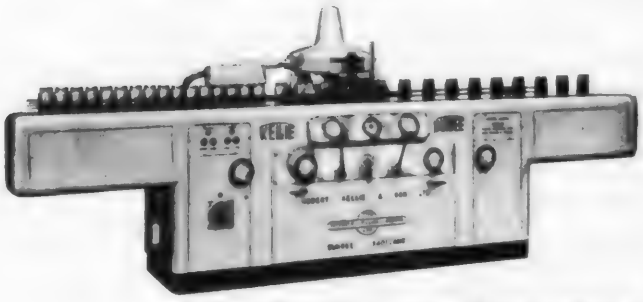
Modern production techniques call for the minimum possible handling of raw materials, intermediate products and finished goods, and the maximum possible amount of automatic control . . . and all this to function efficiently and economically. These are only a few of the reasons that Kellie of Dundee, who have been producing Jam Finishing Production Lines for almost fifty years, are recognized as the leaders in the Design and Production of Automation Equipment for Modern Preserve Factories. The many installations of leading manufacturers are functional testimonies to the progressive outlook of Kellie of Dundee . . . the company which produced the machinery on which the original jelly marmalade was made. This is only one of the "firsts" which has kept Kellie in the lead for nearly half a century.



Stainless Steel Boiling Pan with Bottom Outlet.



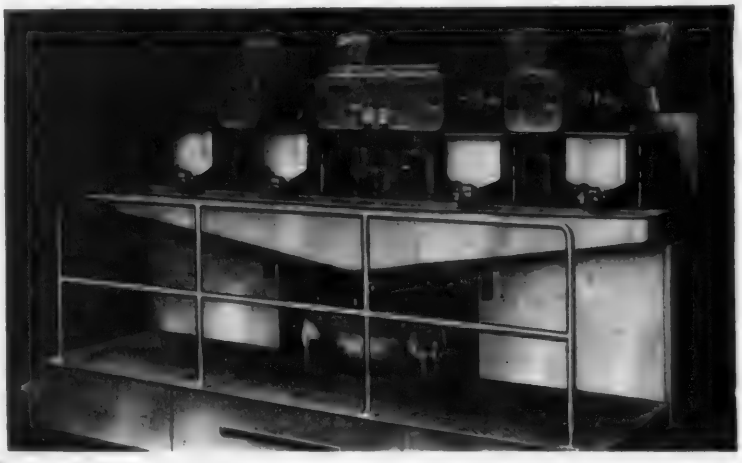
Continuous Washing, Rinsing and Sterilising Machine for Jars, Type 50 JJ.



Straight-Line Automatic Filling Machine for Jams and Jellies (120 containers per minute), Type 11 FP.

Illustrated here are a few of the machines and ancillary equipment available from Kellie of Dundee. Whatever your preserve manufacturing requirements may be, call in Kellie of Dundee . . . they are the specialists.

Write or telephone now for details of the Kellie Technical Consulting Service. It is free and without obligation.



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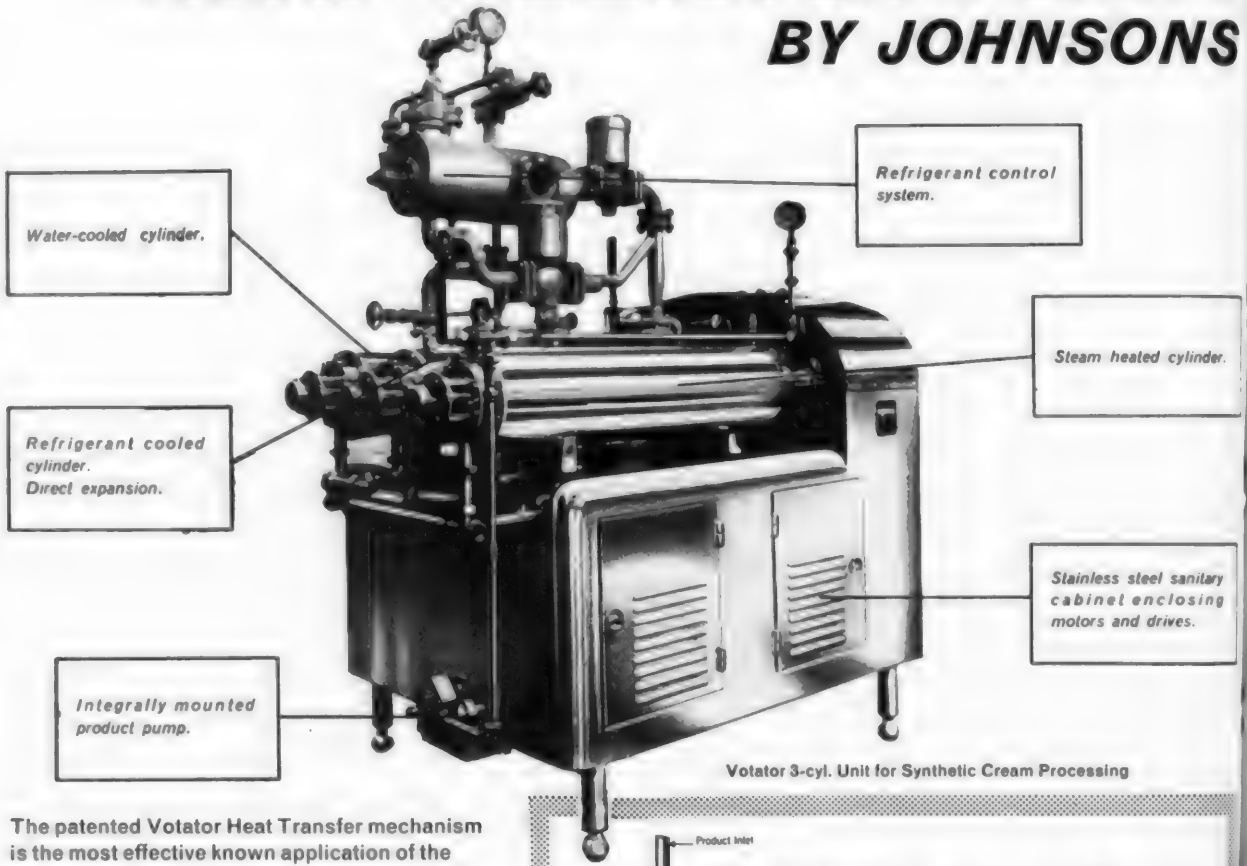
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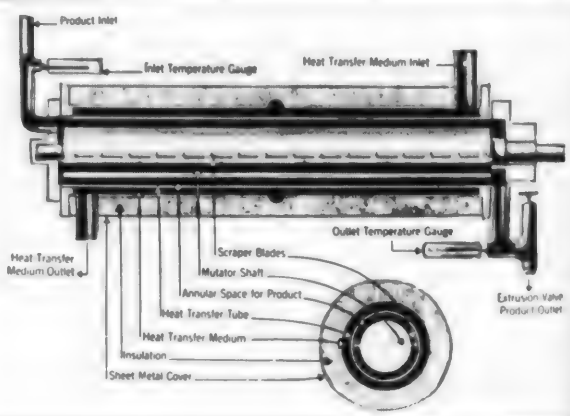
Refrigerant cooled cylinder. Direct expansion.
Stainless steel sanitary cabinet enclosing motors and drives.
Integrally mounted product pump.

Votator 3-cyl. Unit for Synthetic Cream Processing

The patented Votator Heat Transfer mechanism is the most effective known application of the theory that a clean heat transfer surface, combined with a high ratio of surface to volume of material being treated, gives the best results in the rapid cooling or heating of a continuous flow of liquid or viscous products.

Shown here is a Votator 3-cylinder unit for the rapid heating and cooling of synthetic cream. It is one of many Votator units made by Johnsons for rapid, hygienic and continuous cooling or heating of a great variety of food and confectionery products. A Votator Unit may solve your processing problem. Johnson's engineers and their Votator Pilot Plant Laboratory are ready to help you.



VOTATOR SYSTEMS HAVE THIS HEAT TRANSFER MECHANISM

This mechanism provides a large heat transfer area in relation to the volume of material being treated. It maintains that very desirable balance by constantly scraping the heat transfer surface clean.
Material to be processed is pumped through the narrow, annular passage between the heat transfer tube and the rapidly revolving mutator. Scraper blades attached to the mutator shaft agitate the material and keep the heat transfer surface clean. This dual action effects a high rate of heat transfer with viscous or liquid products. The net result is a remarkable volume of material processed in comparison with other equipment.

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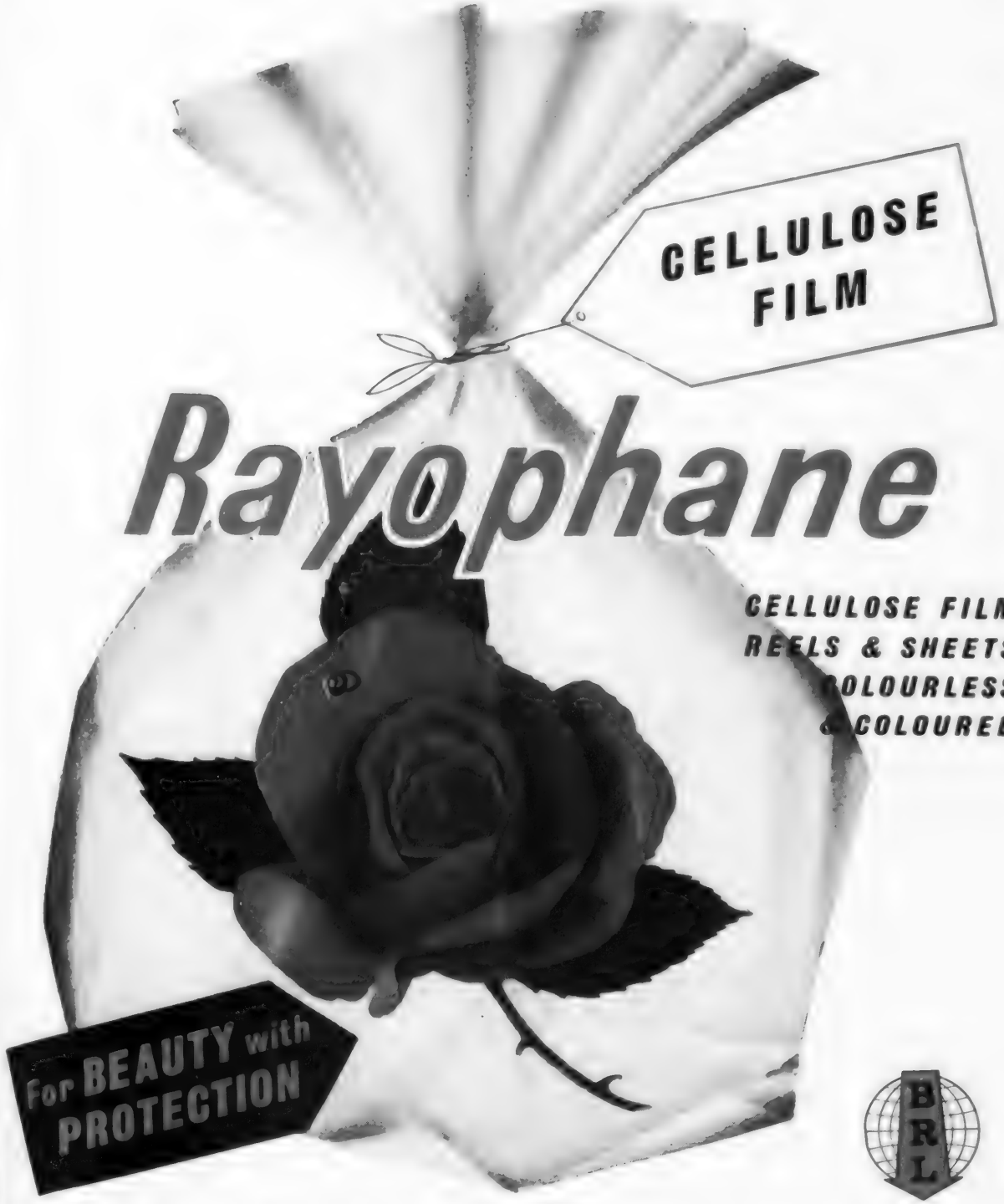

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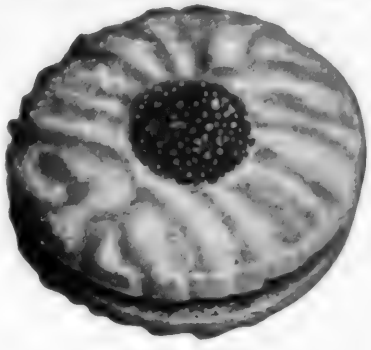

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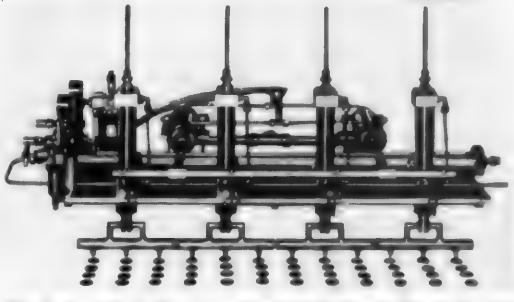

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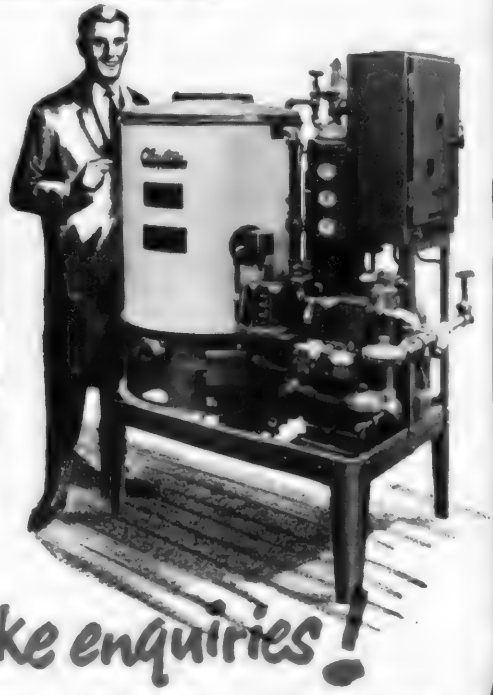

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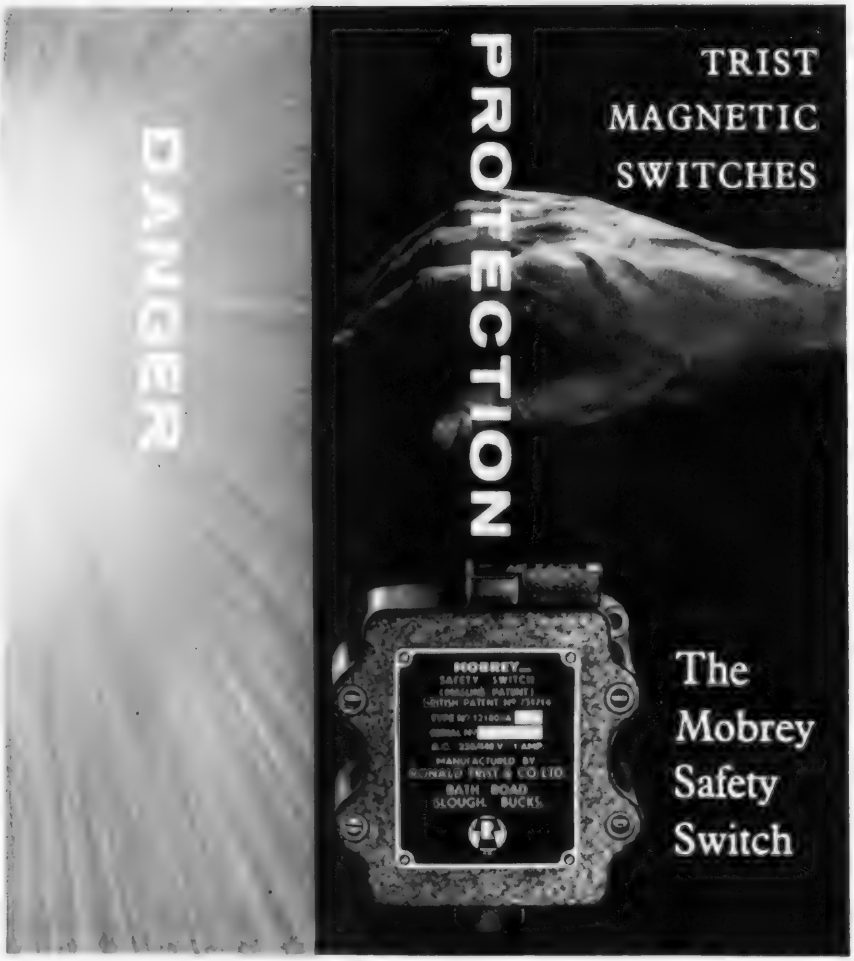

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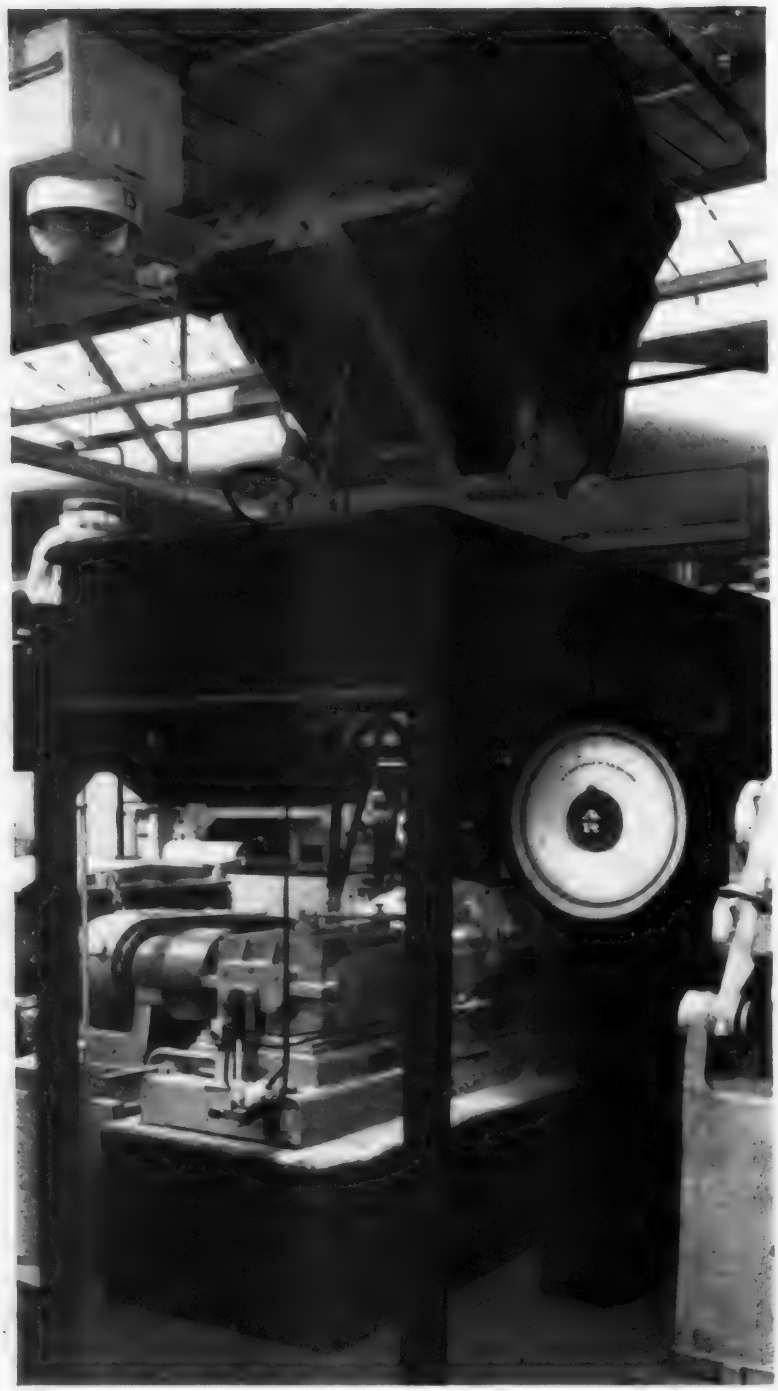

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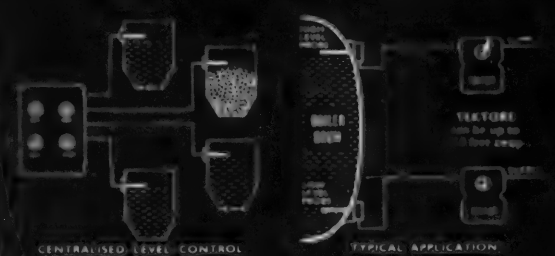

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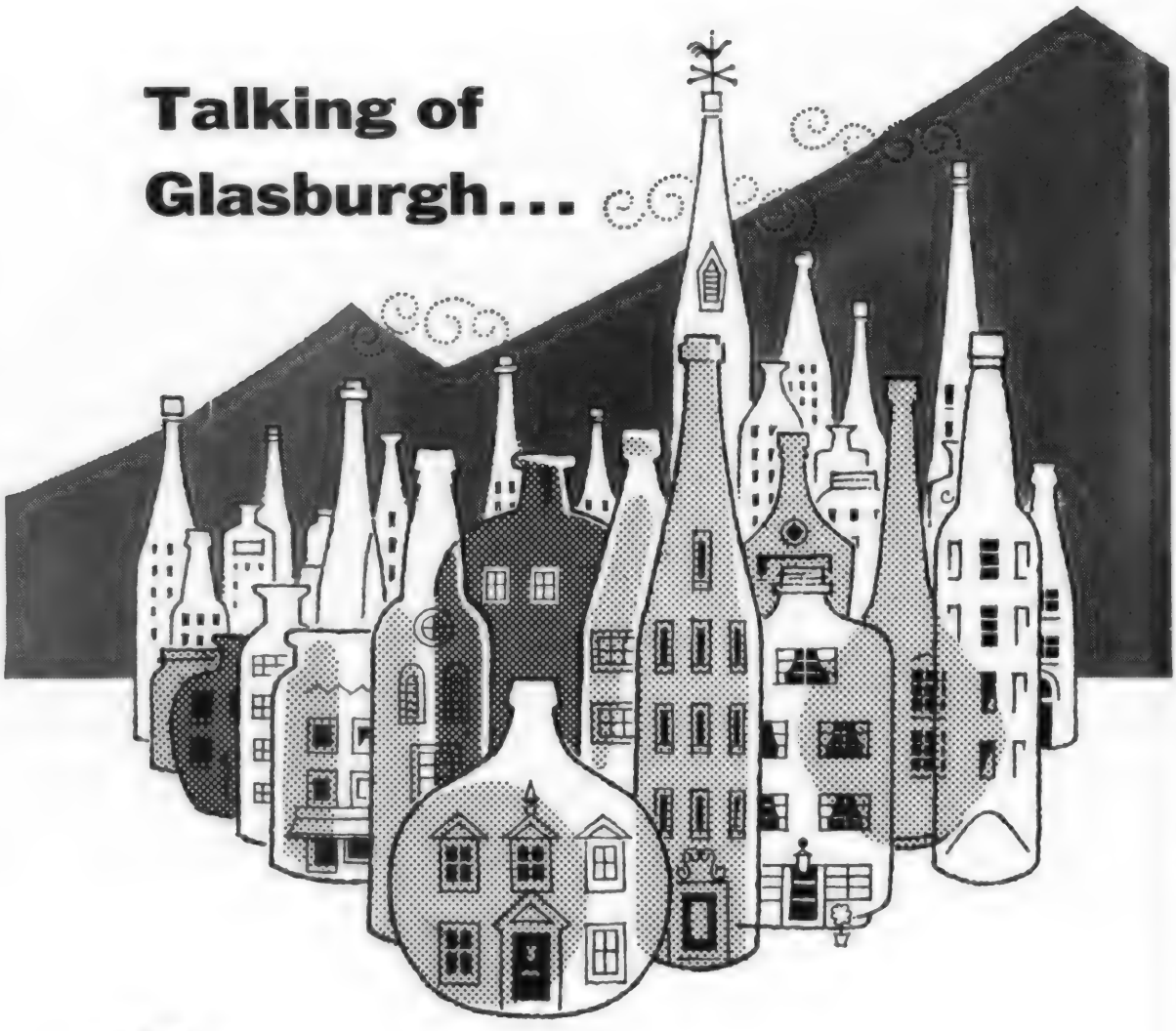

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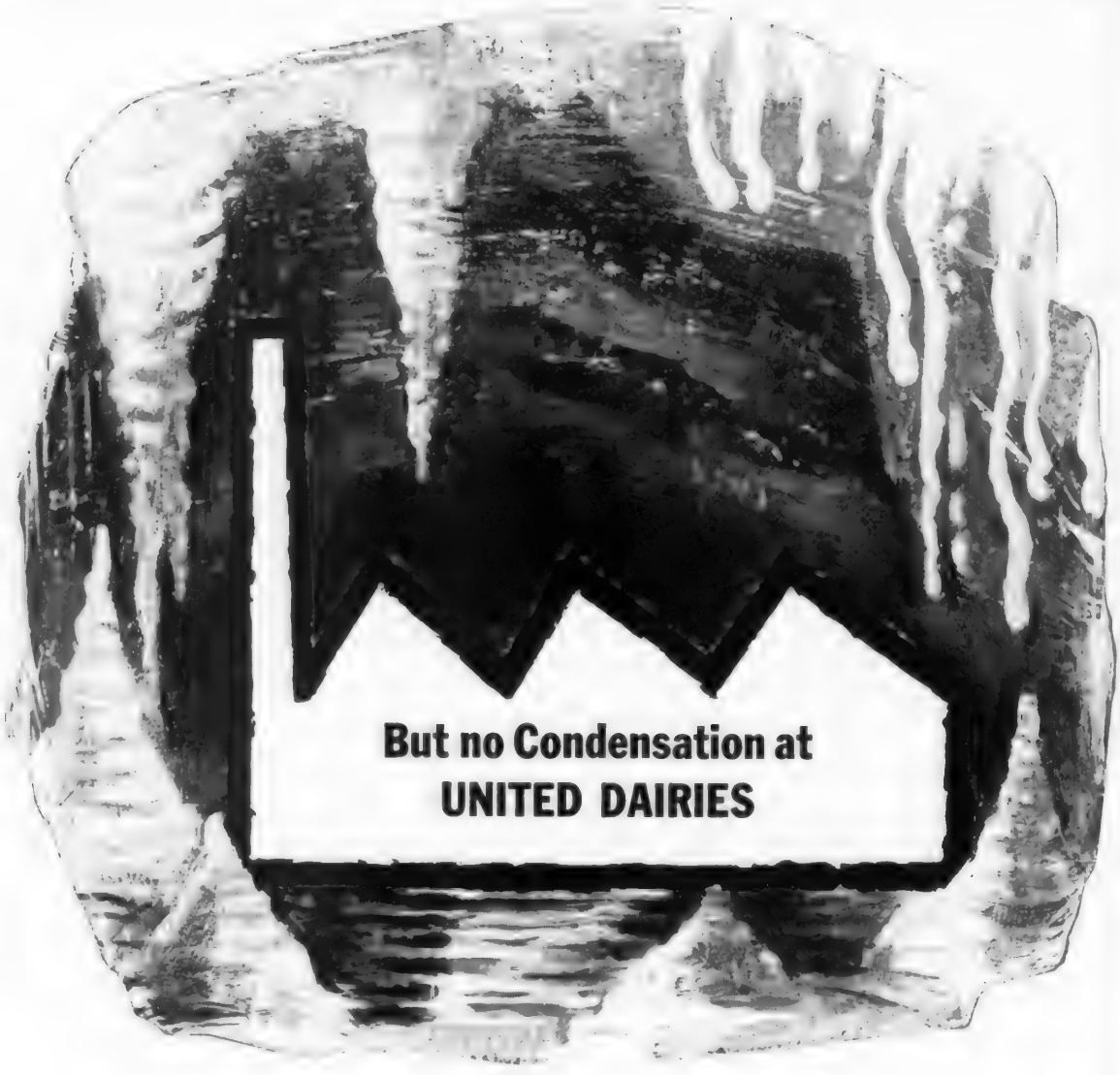

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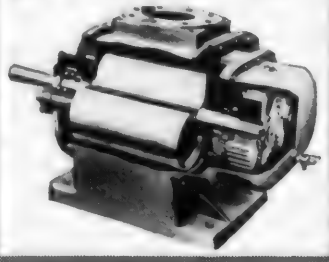
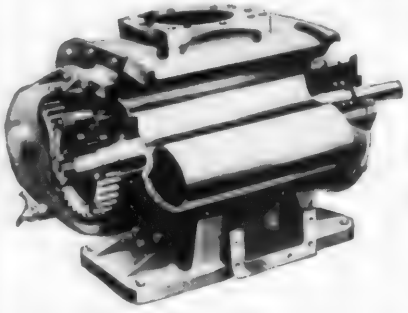


A 7" type RBS blower. Capacities from 1410 c.f.m. at 1 lb. p.s.i. to 450 c.f.m. at 15 lb. p.s.i.



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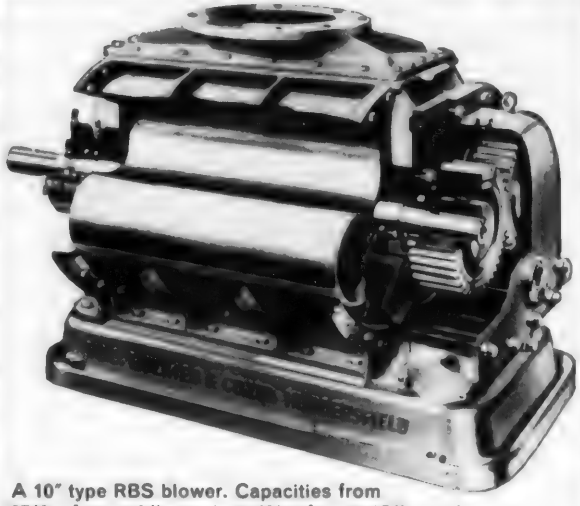

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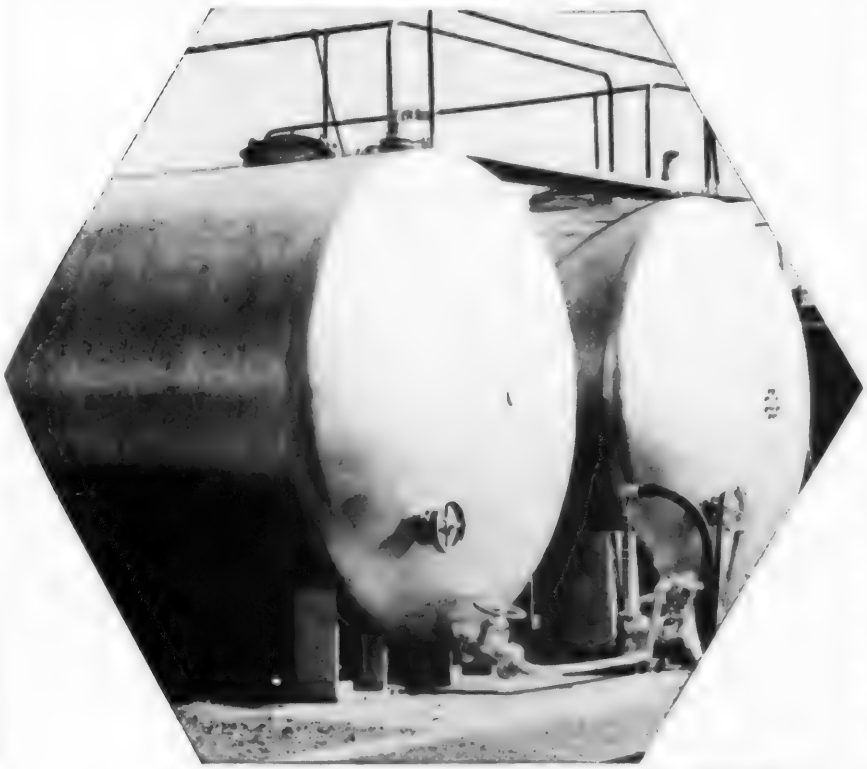
PFAUDLER glassed-steel tanks



The two 9,000 gallon Pfaudler tanks illustrated are installed at the Paisley *Golden Shred* Works of James Robertson & Sons Ltd., and are used to contain citrus and other fruits. Robertsons also have five similar Pfaudler tanks at the *Golden Shred* Works in Bristol, and six tanks at the *Golden Shred* Works at Catford, London. A number of these tanks have been supplied complete with agitators. Pfaudler glassed-steel tanks have exceptional resistance to acids and extremes of temperature. The smoothness of the glass lining gives easy cleaning and does not hold particles which could build up to cause product contamination. For hygienic storage and processing tanks and equipment with maximum resistance and minimum maintenance—specify PFAUDLER every time.

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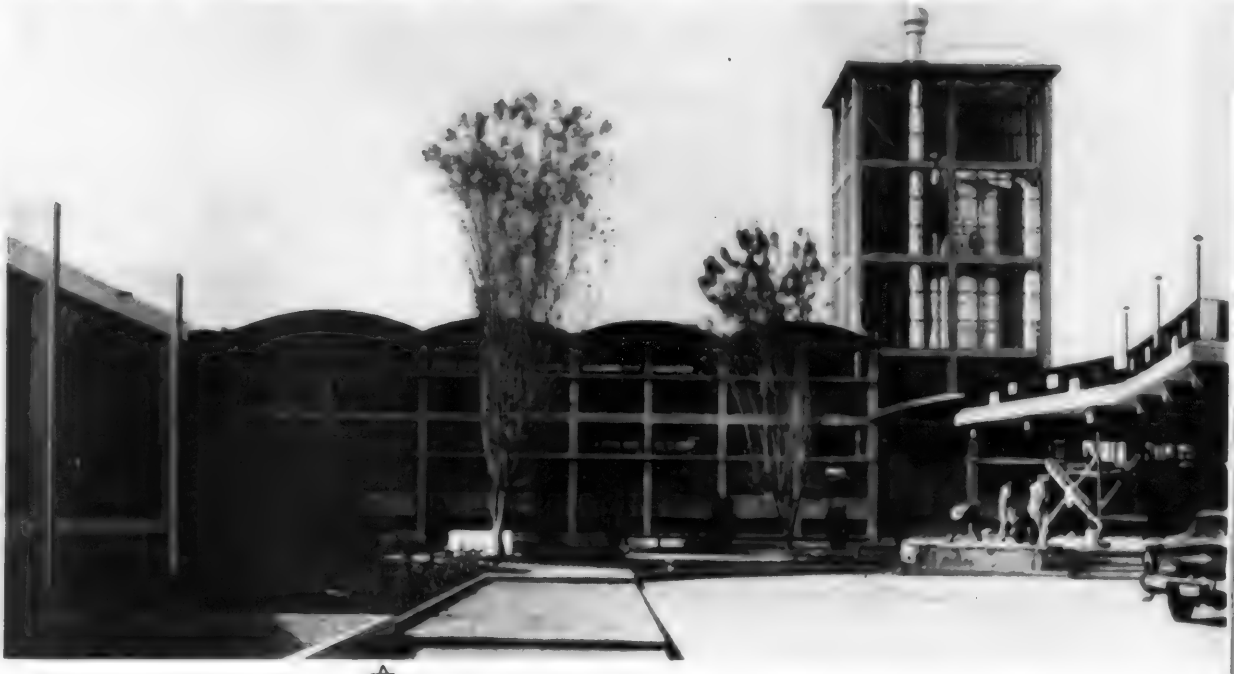

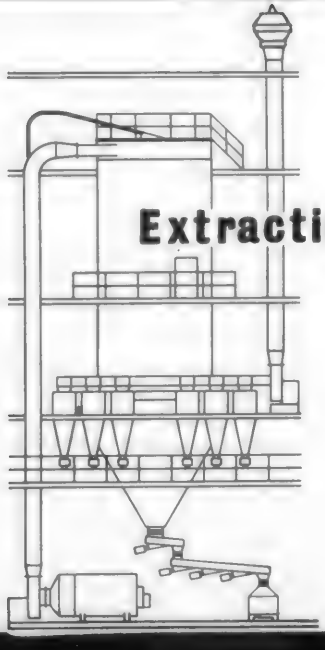

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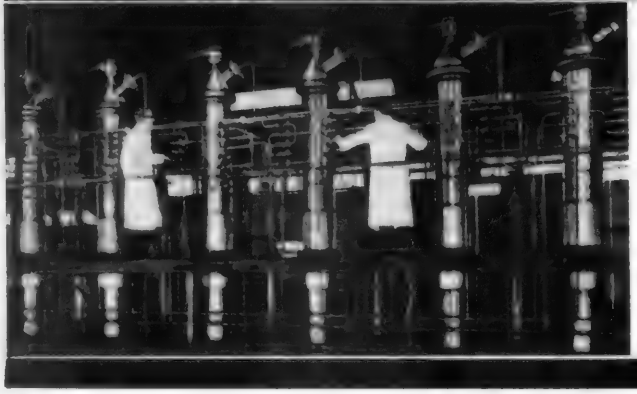
Extraction governs profits

The appearance and texture of the final product—which must conform to variable market requirements—are controlled to a great extent during the drying process.

Our extraction plants are designed for the accurate extraction of soluble solids to a predetermined yield pursuant to quality requirements.



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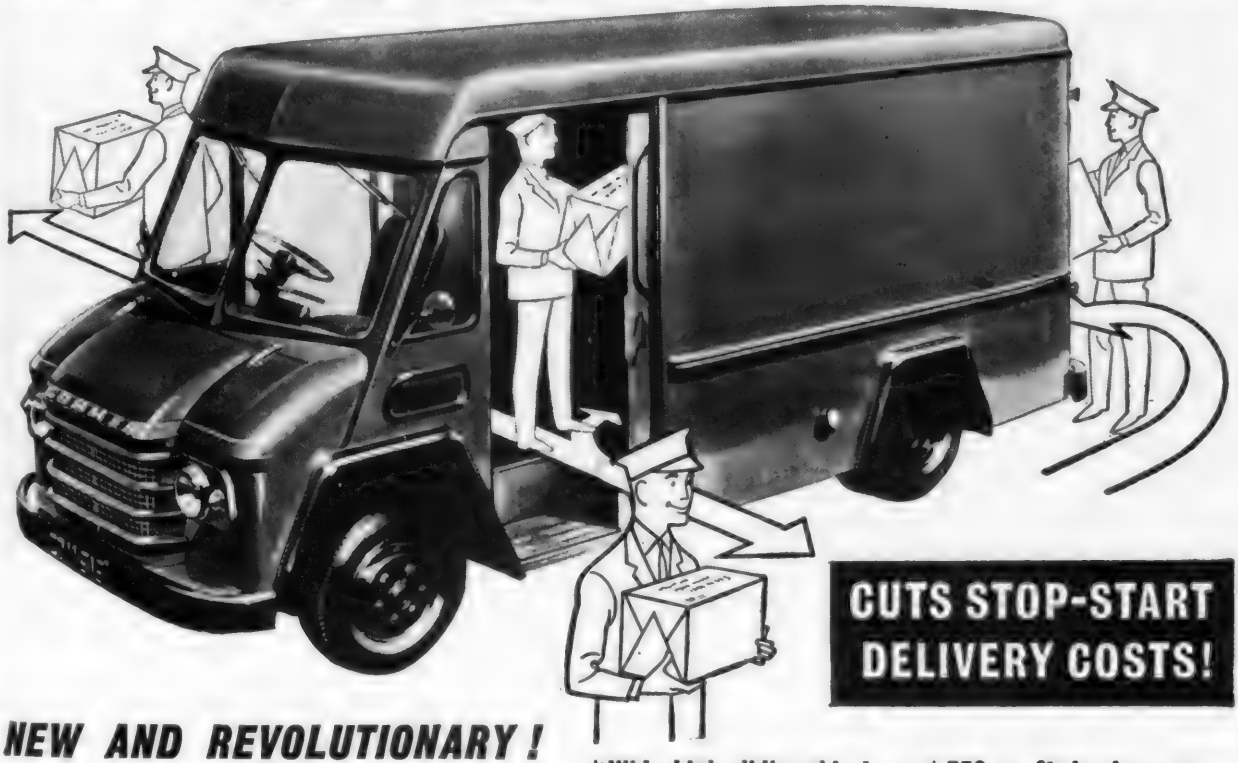

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FOOD Manufacture

Volume 36. Number 11 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. November 1, 1961

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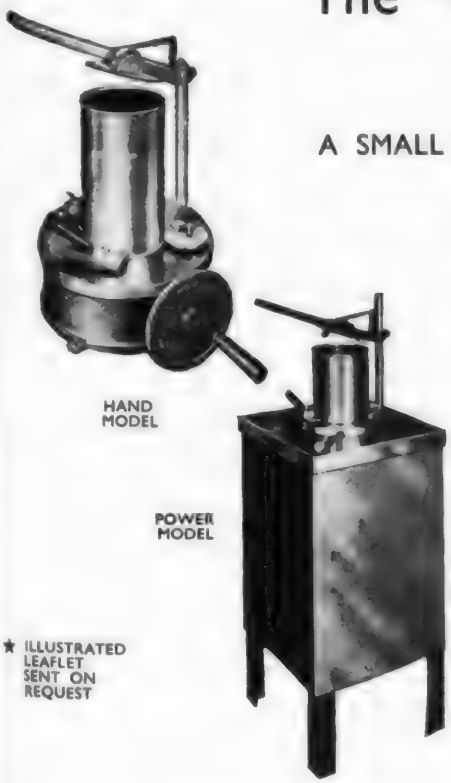
A SMALL MACHINE THAT SOLVES A BIG PROBLEM

IT CLEANLY OPENS CANS IN SECONDS LEAVING NO JAGGED EDGES or METALLIC SLIVERS



★ ILLUSTRATED LEAFLET SENT ON REQUEST

It grips the can with a vice-like grip, cuts out the lid and removes it and any small slivers of metal by magnetism. A special attachment is available for removing the bottom of the can in preparation for baling.

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Number 39 November 1961

Glossary of Terms (cont.)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

Solvent Extraction
(See Bulletins No. 8 and 9)

A method of obtaining oils from oil bearing materials by treatment with a volatile liquid in which the oil is soluble. This mixture is then distilled so that the solvent is evaporated (and used again), leaving behind the crude oil.

Soya Bean Oil (See Bulletin No. 7)

A liquid oil which is used for edible purposes, expressed from the bean of the Soya plant.

Specific Gravity (See Bulletin No. 18)

The ratio of the weight of a given volume of oil or melted fat (or any other substance) to the weight of the same volume of water at a specific temperature.

Stability

The ability of an oil or fat to remain free from deterioration over an extended period of storage under satisfactory conditions.

Stearine

The higher melting portion of an oil, or the solid portion of mixed fatty acids, which has been separated by fractionation or pressing.

Sugar Bloom

This is a bloom caused by small crystals of sugar forming on the surface of the chocolate. When moisture gets into chocolate, it dissolves some of the sugar forming little globules of sugar syrup emulsified in fat. After enrobing, the moisture evaporates from the globules on the surface depositing small crystals of sugar. These crystals are microscopic in size but, when numerous enough, will cause a dull or even grey appearance. Sugar bloom can be identified under the microscope due to the high reflection from the sugar crystals.

Sunflower Oil

A liquid oil which is used for edible purposes obtained from the seeds of the Sunflower plant.

Synergist

A synergist is a substance which, when added to another substance, enhances the power of the latter. For example, when citric acid is added to an antioxidant, the effectiveness is increased.

Tallow

This is a general term which implies a hard fat. When applied to vegetable fats, it indicates hardness and brittleness—e.g. Borneo Tallow, Malabar Tallow. More specifically, this term is used to describe beef or mutton fat.

Thiocyanogen Value (See Bulletin No. 18)

This is a partial measure of the degree of unsaturation of an oil or fat.

Tropical Coating

Chocolate or chocolate type coating which, by virtue of a special fat or additive, will be resistant to high ambient storage temperatures with the minimum of softening and loss of snap.

Unsaponifiable Matter
(See Bulletin No. 16)

This term describes substances present in oils and fats which are not glycerides and are resistant to saponification by strong alkali. Unsaponifiable matter is usually expressed as a percentage of the whole.

Unsaturated
(Refer to definition of "Saturated".)

If the free bonds in a fatty acid chain of carbon atoms are not all occupied by hydrogen atoms, the fatty acid is said to be unsaturated. Oils consisting mainly of the glycerides of unsaturated fatty acids are generally liquid at normal temperatures. (They may be made more solid by hydrogenation which reduces the degree of unsaturation.)

LN 85 8050

FOOD
Manufacture

Vol. 36, No. 11 **November 1, 1961**

Distillation is big business

THERE is no company quite like the Distillers Company Limited. When it was formed in 1877 no quotation could be obtained on the London Stock Exchange. Yet its turnover for last year was £263 million, no less. Of the profits, 82% was accounted for by Scotch whisky and gin, the Industrial Group accounting for the remaining 18%.

Astonishing as it may seem, the D.C.L. Group includes eight major and about twenty smaller blending companies, accounting for a major share of the Scotch whisky market and including such famous names as Haig, Johnny Walker, Black and White, Vat 69, Dewar's White Label, White Horse and others. The company also own Booth's, Burnett's and Gordon's gin, to mention only three. These brands are world famous and, far from having to push sales, the distilleries cannot supply the demand.

A difficulty facing the potable spirit industry is the inflexibility of production. According to law, Scotch whisky must be matured for at least three years. In fact, the leading brands are matured for a much longer period. Production plans must be based on the anticipated demand in the years ahead when the matured whisky is available for sale. In boom years it is tempting to assume that the rate of increase in demand will continue indefinitely, but this cannot be guaranteed. Nevertheless, the indications at present are that the barometer in the international market for Scotch Whisky is set fair. Right from its inception, however, the company has been producing not only liquor but yeast and alcohol for industrial purposes, and the present vigour of the Industrial Group ensures that if liquor prosperity declines the company has many other strings to its bow.

Trends in sophisticated drinking are largely dictated by fashion. When the D.C.L. was formed, whisky was out of fashion among sophisticated Londoners, but today whisky drinking is regarded as "class," in this country and perhaps even more so in U.S.A. An illustration of the way in which fashion determines drinking habits is the growing popularity of vodka, which, we are convinced, is by no means a drink to which western palates take naturally. Vodka has occupied a large section of the American spirit market since the end of the war, but in this country sales started from scratch only a few years ago. D.C.L. launched *Cossack*, produced by Burnett, in September of this year. In this connection it is interesting to note that the D.C.L. stand, at the recent British Trade Fair in Moscow, was one of the most popular in the fair, attracting the attention of no less than Mr. K. and his wife.

Ireland's industrial free-for-all

AN ADDRESS by Dr. J. P. Beddy, chairman of the Irish Industrial Development Authority and of the Industrial Credit Co., Ltd., recently gave some very pertinent information on Ireland's growing industrialisation and the opportunities which this offers to foreign industrialists. To put it in a nutshell, the Irish Republic is opening its doors to industrial firms of any nationality and is offering incentives not only in the form of cheap and abundant labour and excellent transport facilities to all parts of the world, but cash non-returnable grants covering up to the full cost of site and buildings plus half the cost of plant and machinery as well as the cost of training workers, and considerable tax concessions.

We remarked on the parlous state of the Irish economy on p. 271 of our July issue, due principally to lack of sufficient work in Ireland and a declining population. The latter is a serious problem; figures given by Dr. Beddy show that the rate of decline was 2·1% in the five years ended 1956 and 2·9% in the five years ended 1961. The small size of the home market made it obvious that if Ireland were to be industrially developed, goods must be manufactured primarily for export, and the current development programme is directed mainly towards this end. One of the results hoped for is not only the provision of adequate employment for Ireland's present population, but the return of some of the people who have left Ireland to seek jobs elsewhere.

Grants already given are considerable. From 1952 to March 1960 grants of £4·1 million were made in respect of 92 projects; from March 1960 to

March 1961 a further £3·2 million was given in respect of 37 projects. The food industry has come in for its share, and among the firms establishing factories under the programme are APV-Desco in Dublin, Dairy Supply Co. in Limerick, Atlantic Alginates (who make seaweed meal and alginates at Ballyconneely and Clifden), a Dutch fish-processing firm at Dunmore, a French fish-cannery at Kinsale, an American chewing-gum factory in Kildare, and others.

Recent legislation provides that no income tax or corporation profits tax is payable on profits earned on new exports for a period which for the present is ten years. Income tax is at present 35% on net profits, and corporation profits tax is 10% on profits exceeding £2,500 p.a., but this tax is deductable in computing profits for income tax. The combined rates of the two taxes represents 41⅔% of profits.

An exceptional situation exists at Shannon Airport, where an industrial estate is being established within the customs-free area under the ægis of the Shannon Free Airport Development Company, who build factories in advance of occupation; a manufacturer may build his own factory with the aid of a grant if he so wishes.

It's quality that sells, not premium offers!

WITH tremendous bangs of the big drums, announcements about "the greatest advertising campaign of all time" and press releases liberally spiced with such expressions as "advertising of tremendous weight and colossal impact," the new season's commercial wars are well under way. The soup people, we notice, are well to the fore. The consumer, reeling from the hard hits, impacts and tremendous blows aimed at him from press, radio, TV, poster hoardings, from everything in fact that he sees and hears, may be forgiven if he does not know which way to turn. Already, it seems, he has developed such an immunity to the effects of mass advertising that bigger and still bigger campaigns have to be planned year by year to capture his attention. Where, may one ask, is all this nonsense to end?

Perhaps we may not ask, for it is all good for business, and that is what we are in business for. At any rate, cowering out of the line of fire behind our editorial desk we are thankful that our task is in the main to try and help the manufacturer make his products and not to proffer advice on the ever more formidable job of selling them.

A trite remark, perhaps, but well worth keeping in mind—massive campaigns may initially capture markets, but it is only quality which keeps them.

The cereal symposium

AS WAS gently inferred by Dr. D. W. Kent-Jones in his opening address, the cereal symposium recently held by the S.C.I. Food Group had less to do with processing than its title—"Recent advances in processing cereals"—would suggest. Perhaps the term "processing" had a wider meaning in the minds of the organising committee members than it has in our own. There are two kinds of processes, natural and man-controlled, and the common meaning attached to the term "processing" of any kind of food is usually restricted to the man-controlled kind, and does not include natural processes such as growth; a possible exception to this, however, is the process of malting. We would not, therefore, have expected papers on the subject of plant breeding and genetics to be included in the symposium, even though the two papers on this subject showed how plant breeding studies contribute to desirable processing qualities in wheat and barley.

A noteworthy omission from the symposium was any reference to the production of breakfast foods. Was this because the fundamentals of breakfast cereal production are of insufficient academic interest or because no speakers on this subject could be found? One difficulty in this connection is that production of these foods is in the hands of a few large firms in vigorous competition with one another who might be reluctant to divulge the fruits of their researches for the benefit of their competitors. We have also heard it suggested that there is nothing in breakfast food manufacture of great interest to the cereal scientist.

Of the three papers having the greatest direct bearing on cereal processing, two were devoted to the isolation and modification of starch and the third to the mechanical development of bread doughs.

Mr. Soames and prayer

MR. SOAMES'S request that prayers be said for a right decision on Britain's entry into the Common Market is ridiculed by a Sunday newspaper, which says that this shows the confusion existing in Government circles, inferring of course that prayer is the last resort of irresolute men. On the contrary, this only indicates the confusion existing in the editorial mind of the newspaper concerned. Surely it is an indication of right order, not confusion, to pray that man's God-given powers of reason and judgment be used aright. Looking around the world in its present state, we are justified in assuming that requests for divine guidance on the part of its rulers might have efficacious results.

Analysing digestion

MAKERS of indigestion pills will be interested to learn that a technique for measuring the digestibility of different foods has been developed in the U.S.A. by the Stanford Research Institute. When we eat food that we can digest only partially, the undigested portion descends to the lower part of the small intestine where bacteria get to work on it. The by-product of this bacterial attack is hydrogen gas and the resulting discomfort depends on the amount of gas evolved; this, in turn, depends on the constitution of the flora of the individual and the amount of undigested food.

It was decided that the hydrogen evolved could be used to measure the digestibility of foods. It passes into the bloodstream unchanged and eventually finds its way into the lungs whence it is expelled in the breath. A gas chromatograph was modified to determine the amount of hydrogen in the breath of an individual after eating different foods. In this way the culprit foods could be identified.

According to *Nature* (1961, No. 4776, p. 596), an outcome of the experiments was a technique for making beans more digestible. A chemical and leaching process did the trick without altering their taste.

Who wants to live for a thousand years?

A WORD of caution against too ready acceptance of the theory that coronary disease is caused by a nutritional deficiency of certain fatty acids comes from Professor John Yudkin in recent issues of *The Practitioner* and *The Times*. He says that "it may even be said that the balance of the evidence is against the hypothesis." As is well known, it has often been maintained that because these fatty acids occur more widely in vegetable oils than in animal fats, excessive consumption of the latter can cause coronary disease.

Excessive consumption of any food can cause trouble. If a motor-car engine is run consistently with the choke out, carbon formation is excessive, plugs and valves become sooted up, lubrication holes become blocked, wear is increased and eventually some part fails before it should and the engine stops. So too with the human engine. It can put up with a surprising amount of abuse and, unlike a motor-car engine can, within limits, correct its own faults. Also unlike any man-made engine it manufactures its own materials of construction continuously and up to a certain point replaces worn materials with new, all this without stopping. But one thing it will not do, and that is run for ever. Sooner or later it wears out quicker than its replacements department can cope and then—*pouf!*—its owner, in Shakespeare's apt expression, shuffles off this mortal coil.

Modern medicine and surgery do wonders in prolonging the inevitable end, and a man who might once have died of appendicitis at twenty may now live to contract diabetes at forty. Of this he would once have died, but now insulin therapy keeps him alive until his coronary arteries thicken up at sixty. Even this is not the end, for in spite of dietary controversy, skilled medical attention delays the fatal attack of thrombosis to enable him to die possibly of cancer at eighty. "Poor fellow," say his friends, shaking their heads. "What a terrible way to die," not knowing that the man with the scythe has been cheated for sixty years.

And so it always will be. When one scourge is eliminated, another is there to take its place. Nature, be it noted, is always more concerned with the welfare of the species than with the individual. Men reverse the process by concentrating effort on keeping alive for a few more years the aged and infirm and at the same time prevent new life and kill the infant in the womb. Why should we be surprised when outraged Nature, ejected by the door, comes in by the window?

The law concerning effluent discharge

THE RIVERS (Prevention of Pollution) Act, 1961, which came into operation on September 27 makes important changes in the law relating to the discharge of trade and sewage effluents to rivers.

Its principal effect is to require the river board's consent for all discharges existing before the commencement of the Rivers (Prevention of Pollution) Act, 1951—as it is already required under that Act for discharges which have begun since then.

The first section of the new Act provides in effect that, after a date to be appointed by the Minister, it will be unlawful to make a discharge of trade or sewage effluent to a stream (except a discharge that has already received consent under the 1951 Act) without making application for the river board's consent.

The section 2 of the Act provides certain protections which operate during the interim period when an application has been made but no consent given or appeal determined. Under this section, where an application is duly made before the appointed date, the discharger (provided that the discharge remains substantially as stated in the application) will not be guilty of an offence under section 1 of the Act (for discharging without consent); or under sections 2 and 3 of the Act of 1941 (which control the discharge of polluting matter into streams); or under section 8 of the Salmon and Freshwater Fisheries Act, 1923, any bye-law under the Sea Fisheries Regulation Acts, 1888 to 1894, or under certain enactments relating

to discharges from gas works. These protections continue until an application is disposed of.

Section 4 affords the same protection for discharges to which consent has been given provided they comply with the conditions.

Conditions will take effect three months after they are imposed unless during that time the appellant exercises his right of appeal to the Minister on the ground that the conditions are unreasonable. In that case they will not take effect until the appeal is withdrawn or determined.

The date appointed by the Minister is to be not less than twelve months after the commencement of the Act, but applications for consent may be made and consents may be granted now, and conditions attached to a consent may be enforced as soon as they have taken effect.

Twenty million working days lost through accidents

ONE in every four reportable factory accidents involves manual handling of goods and materials, and accidents involving transport of goods are rising while other causations are decreasing or remaining steady. This point is made in the current issue of the Ministry of Labour's publication *Accidents: how they happen and how to prevent them* (H.M.S.O., price 1s. 3d.), the major part of which is devoted to accidents in these two categories. The rest of the booklet is concerned with accidents involving process machinery and electricity.

The British Safety Council is planning a nation-wide series of training courses directed at foremen. The national director, Mr. Leonard Hodge, says that the 25% increase in accidents to young workers over the past two years would suggest that present methods of accident prevention in factories are ineffective. He believes that the foreman is the key figure in accident prevention, because, unlike the safety officer, he is on the shop floor all day long and he can see where the faults lie and can talk more easily to the young workers. It is claimed that in factories in other countries where foremen have been specially trained in safety, a significant reduction in accidents has generally followed.

We never did think much of the effectiveness of safety officers, well-intentioned though they be. Where there is a safety officer the management is too inclined to slip into the complacent view that now such a person has been appointed they have done all that is necessary and that everything can be left to the safety officer. Very often this person has too little powers to enforce really effective provisions. We have always held the view, which has been proclaimed more than once in these columns, that safety consciousness comes from the top, the board of directors. Teaching foremen the fundamentals of safety is of little value unless the training is backed by constant prodding from top management. Not only the foremen, but the managing director also, should know what goes on on the factory floor.

Twenty million working days were lost to British industry last year through accidents, about five times as great as that caused by all strikes. This graphically illustrates the importance of the problem, without considering the unnecessary suffering caused to the persons concerned.

Tin in canned prunes

REPORTING on the problem of tin in canned prunes, Durham county analyst says that in 1957 thirteen brands, comprising forty-nine samples, were examined. Five brands comprising nineteen samples contained excessive amounts of tin. A number of other brands contained appreciable amounts of tin.

The problem appeared to be so general that representations were made to the Fruit and Vegetable Canning and Quick Freezing Research Association and to the individual canners. Whilst some of the defective samples were probably from stock which had been kept too long, quite a large number had only been canned a short time and it appeared that prunes presented a special canning problem.

He says that the Research Association started an investigation into the problem and last year published their results and recommendations for the canning process. In addition they suggest that whatever the canning process, if plain cans are used the tin content will probably be excessive after two years' storage. With proper precautions in canning, the tin content will probably be satisfactory for eighteen months. If lacquered cans are used, very little tin is dissolved but the flavour of the prunes may be affected.

The county analyst reports that during the last quarter seventeen samples of canned prunes were examined. These were of five different brands. Two samples of different brands contained excessive amounts of tin. Six further samples of one of these brands and five further samples of the other brand were all satisfactory.

So far this year, eight different brands comprising twenty-two samples have been examined, and the above are the only two found unsatisfactory. This is a great improvement on the position in 1957.

" If the recommendations are carried out and if the wholesalers and retailers avoid holding stock for long periods, the improvement should continue," he reports.

General view of the D.C.L. yeast factory at Dovercourt, showing five of the outside fermenting vessels.

How D.C.L. produce Bakers' Yeast

130 tons a week from world's only continuous plant

We recently visited the only factory in the world producing bakers' yeast without alcohol by a continuous fermentation process. This plant, operated by the Distillers Company, Ltd., at Dovercourt on the Essex coast, produces every week 130 tons of yeast grown under sterile conditions from single cell cultures at a rate of two tons per hour.

THE conversion of D.C.L.'s Dovercourt Yeast Factory three years ago to continuous production was a milestone in the history of the yeast industry, for it brought to reality an idea which had been maturing in the mind of Mr. A. J. C. Olsen, D.C.L. division director, for some thirty years. The earliest German patents in this field covering the continuous addition of nutrients and continuous withdrawal of yeast date as far back as 1915. A British patent, published in 1928, established the basic Dovercourt process of a series of fermentation vessels, each being used for a particular stage in the growth of the yeast, the fermenting liquor being pumped from one vessel to the next, so that a steady transfer and continuous growth of yeast is achieved.

Basis of process

The essentials of the process are the growing of a yeast culture in a nutrient medium of molasses, phosphate, ammonia and water under controlled conditions of temperature, acidity, and aeration, the nutrient medium or wort being added continuously to each stage and the yeast separated continuously after the completion of propagation in the final "ripening" vessel. Theoretically, the process could proceed indefinitely, but in practice a limit of about eighty hours is at present set by the difficulty of maintaining sterility for longer periods. The introduction at any stage of only one micro-organism could result in a rapid propagation of the unwanted organism and contamination of the final product. It is thus very creditable that the plant can achieve such a period of continuous running, producing bakers' yeast conforming to the high standards of quality which are required to-day.

The principal raw material is a blend of beet and cane molasses used in solution, the proportion of

cane molasses varying from 20% to 50% according to availability and requirements. The preparation of the molasses solution, its sterilisation and the control of its concentration are all carried out continuously and automatically, as required by the process.

Nitrogen requirements for the yeast are supplied in the form of aqueous ammonia, which is delivered in tanker loads of 2,000 gallons at a time and stored in underground tanks. Average ammonia usage is about 3,000 gallons per week.

Additional raw materials required in much smaller quantities include di-ammonium phosphate and magnesium sulphate, both of which are used in the form of concentrated solutions, and sulphuric acid which is used to control the *p*H of the fermenting liquors.

Fermentation vessels with the instrument control room in the centre.

Interior of instrument control room.

Cooling water is drawn from three bore wells on the site and aeration, used both for agitating the fermenting liquors and for supplying the oxygen requirements of the yeast, is provided by three electrically driven blowers having a total output of 24,000 cubic feet of free air per minute.

The yeast culture

The culture is obtained from the D.C.L. Central Research Department at Epsom and is grown from a single cell isolated by micromanipulation. This is delivered weekly in half-gallon containers and is substantially increased in a culture vessel before being used in the main process.

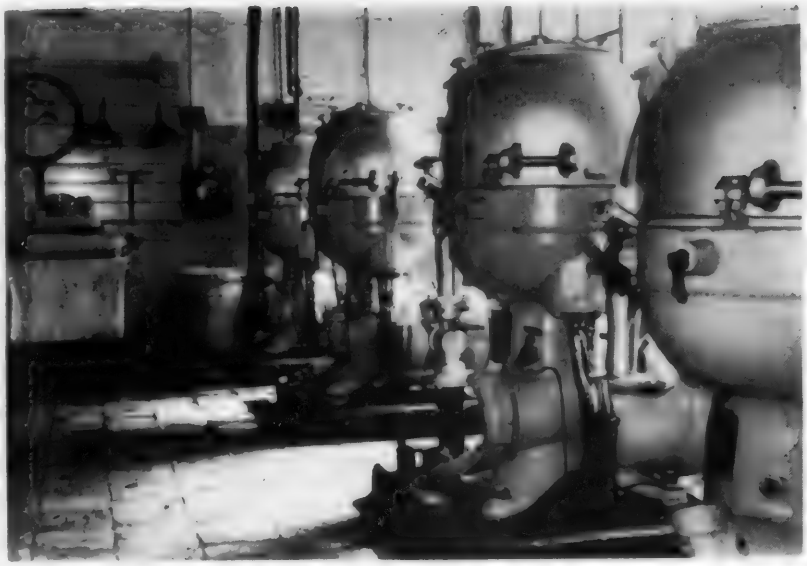
The plant

The heart of the plant is the series of jacketed stainless steel fermenting vessels, each 20 ft. high and 12 ft. 6 in. in diameter. These are mounted in two rows of five on either side of the central control room in such a way that the process operator has ready access to the controls on the top of each vessel. Six of these vessels are normally used for each propagation, the last one functioning as a "ripening" vessel.

Steady temperatures are automatically maintained during propagation by the controlled circulation of cooling water through each fermenter jacket, and aeration and agitation are provided by the air which is blown in at the bottom of each vessel through a set of perforated pipes.

The various feeds—water, molasses, phosphate, nitrogen, antifoaming agent and sulphuric acid are metered automatically into each fermenter. The sterilised molasses solution is added through glass dosage vessels controlled by an electronic timer, the supply of phosphate is regulated by a flow meter fitted with a warning device to indicate any deviation from the correct flow rate and the sulphuric acid addition is controlled by a *p*H recorder/controller. Water addition is indicated continuously by flow meters, again with deviation warning devices.

Nitrogen feed is monitored by an automatic analyser in the central control cabin, to which samples from all the fermenters are supplied at regular intervals.



Centrifugal yeast separators, fully enclosed.

The process

The first stage in the process is to increase the ½ lb. of cultured seed in a 1,000 gallon stainless steel vessel maintained under sterile conditions in a sealed culture room. The culture is transferred aseptically to this vessel and grown in a nutrient medium for approximately 20 hours. All possible care is taken to ensure that the culture room is kept as near to sterility as possible.

This seed yeast is then pumped over to the first fermenter and the build-up phase commences. During this period, the amount of yeast in the fermenter increases exponentially to give the desired volume and concentration of fermenting liquids. With continuing propagation, the volume of liquid increases and this increase is pumped to the second fermenter, which, in turn, is fed with molasses, chemicals and water until its final volume is reached. At this next stage, yeast and wort are again transferred to the third vessel and this process continues until all the fermenters are filled to the required level. At this point the build-up phase ends and the on-stream period begins, with yeast being withdrawn and passed to the separators at a constant rate at about two tons per hour.

Chemical and nutrient feeds are cut off and aeration greatly reduced in the final, or "ripening" vessel. At the end of the on-stream period, all feeds to the first fermenter are stopped and the run-down phase commences, during which the contents of this and succeeding fermenters are passed forward through the system, and yeast continues to be fed to the separators at the same rate as during the on-stream period.

For an average run the timetable of operations might be:

Build-up phase	...	27 hr.
On-stream ...	...	63 hr.
Run-down phase	...	17 hr.

giving a steady flow to the separators lasting 80 hours.

it is interesting to note that the whole process, including the "build-up," "on-stream," and "run-down" phases, is programmed and controlled by instruments set in the central control panel.

Separation, filtration and packing

From the last, or "ripening" vessel, the yeast containing liquor

Continuous filter discharging yeast to packing machine below.

passes to a system of centrifugal separators and water injectors. Nine separators are used and these remove 90% of the unwanted liquor, giving a "yeast cream" containing approximately 700 g./l. of yeast. This yeast cream, previously washed by the water injectors, then passes to continuously operating rotary vacuum filters which remove the remaining unwanted liquid, leaving the solid yeast on the rotating surfaces of the filters, from which it is removed by "doctor knives." The yeast so obtained drops to the automatic extruding, cutting and wrapping machines, where it is extruded as a solid cake, and cut up into 1-lb. blocks which are then wrapped in the familiar D.C.L. yeast wrapper. These yeast blocks are packed into 28-lb. cartons which are then transferred to a cold store to await despatch from the factory. At no stage is the yeast touched by hand.

Fully automatic machine for yeast extrusion, cutting and wrapping into 1-lb. blocks.

The outstanding impressions of this visit were the absolute cleanliness throughout the factory and the high degree of control by instrumentation, thus ensuring a product of high purity and regularity so necessary to the present-day baking industry.

BOOK REVIEW

Soup Manufacture

This is a revision of a book written in 1940.* The present edition has been completely rewritten and revised in view of the great advances that have been made in food technology during and since the war.

The book is divided into nine chapters. The first, on soup stock, is in the nature of an introduction, since stock is the basis for all manufactured soups, whether canned, frozen or dried. The plant described in Chapter II is also applicable to all kinds of manufactured soups. Chapter III, "Soups for Canning," contains many recipes and formulæ for meat and vegetable soups, together with a complete list of all the canned soups manufactured in the U.K. Although stress is laid on the need for standardisation and quality control, only very slight mention (p. 47) is made of the chemical composition of the incredients of canned soups. Soup improvers, together with their standards, are discussed at some length. Following this are chapters describing the canning process and the legal aspects. The latter chapter is somewhat sketchy and contains extracts from various circulars together with a brief reference to a court case in 1959. Frozen soups are not made on a large scale in the U.K. and only a short chapter is devoted to them.

Dried soups (Chapter VII) are dealt with in considerable detail, and the chapter is sub-divided into sections on Raw Materials, Formulation (containing recipes) and Manufacture. This chapter is more technical than the chapter on canning, and information is given concerning tests on the composition and microbiology of some dehydrated foods (pp. 104-110). Specifications are also included for fats and proteins suitable for dried soup mix manufacture. It is felt that Chapter VIII on condensed soups should have followed the chapter on canning, since only canned condensed soups are discussed. In conclusion there is a chapter on future developments, and five pages of useful tables and data.

One feels that the book should have been divided into four sections—Canning, Dehydration, Quick Freezing and General, since it is not at all clear whether the chapter on Legal Aspects refers to the whole book or simply to canning. Nor is it clear whether the twelve literature references at the end of the chapter on Dry Soup Mixes refer only to dried soup, since none are given at the end of the other chapters. A short bibliography is given on page 161. For a comprehensive survey of this kind the alphabetical index on p. 167 is inadequate and appears to include only the main headings. There also seems to be no reference to concentrated soups in cube form or to meat extracts.

These, however, are only minor criticisms, and the book is written throughout in a clear and lucid style, and is illustrated with a large number of photographs.—J. G. KENNEDY.

* *Soup Manufacture—Canning, Dehydration and Quick Freezing.* By Raymond Binsted and James P. Devey. Food Trade Press, London, 1960. Pp. 166. Price £2.

Fruit Canning in Argentina is Up-and-Coming

By L. B. Scott

The author recently spent two months in Argentina and his impressions of the fruit processing industry there will interest the canning industry, which may meet increasing competition from this source in a few years' time.

THE Argentine has long been synonomous in Britain with imported beef, whilst in fruit circles there are strong connections with apples and pears. Not very much is known about her as a fruit-canning country, so far as the average housewife is concerned, but, after a two-month visit, during which he saw much of new developments, the writer is sure that very much more will be known in the near future.

The canning industry in Argentina is quite large, and in the fruit-canning section in particular, there is a realisation that Britain represents a good potential market for more and more of its products. It could be, therefore, that another menacing competitor is looming on the horizon. Menacing in the sense that the supply of fresh fruit is enormous, the wage rates comparatively low, plus the fact that the introduction of American machines will enable the canner to compete on most favourable terms with any country in the world.

Because of a more liberal policy on the part of the Government towards imported machines, there is no doubt that more and more canners will avail themselves of these machines, and to aid in this development, the Food Machinery Corporation of San José, California, have plans for the building of a factory in Cordoba, thus fortifying the view that Argentina is ripe for progress in the food industry.

Rio Negro

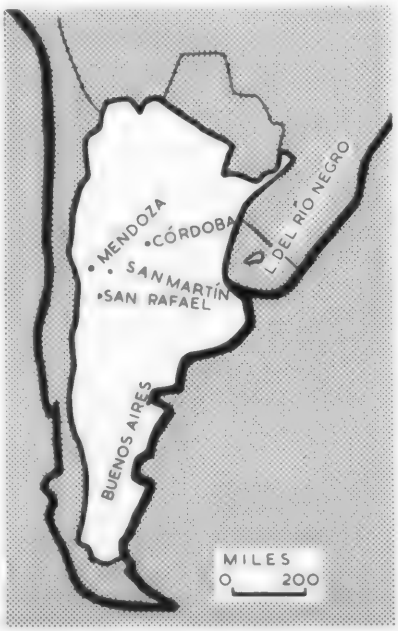
Most pear canners in this country, for example, will concede that the Rio Negro Williams pear is second to none for canning, the quantity canned here being limited only by the available supply. Thousands of cases of fresh Argentine pears are imported to this country each year, but the bulk is sold on the fresh fruit markets.

In the state of Rio Negro alone, the total quantity grown amounts to nearly fifty thousand tons, and whilst there are about two hundred packing stations exporting considerable quantities, there is certainly sufficient to maintain a strong canning industry, which heretofore has operated on backward methods of production.

The state of Rio Negro is one vast irrigation area, where man has used the rivers to advantage, diverted where necessary, and altogether created a system which could well be a model for any area planning a similar scheme, and the area is capable of supporting many more orchards.

Pear canning

The writer was privileged to be in "on the ground floor," as it were, in these developments, as he assisted in the installation of pear canning lines in the region, and subsequently advised on operations from ripening to canning.



Whilst this season was very much an experimental one, the results achieved were sufficiently encouraging to justify an optimistic view of the future, and next season will see a vast increase in output. For the very first time in Rio Negro, pears were machine peeled, and this was such an innovation that visits of inspection were made practically every day by delegations from other canners in the area, and it was obvious there would be a snowball effect.

Anyone who has visited the Rio Negro can vouch for the great temperature variations which can be experienced. During the same day there can be a rise from 42 to 96°F., and there were days when the temperature reached 112°F. Trying to control ambient ripening of pears under such conditions can be a very tricky operation, but it was done by shielding the pears from the direct rays of the sun by day, and allowing maximum ventilation during the night when temperatures were more suitable.

Working on improvised ideas, a cycle of 4-5 days was operated very successfully. By next season, a proper ripening room will be erected in more than one factory, and when this is done, the subsequent operations should be comparatively easy.

Workers learn rapidly

It was thought that learning to operate the peeling machines would be difficult for the women, most of whom had never seen such machines before, nor, for that matter, any food canning machines. Yet, within two days,

they were feeding the pears into the machines as if they had been doing it for years. By the third day, five machines, on a 15-hour basis, peeled 1,200 bushels of pears, necessitating five operators, three inspectors, and seven trimmers, making a total of fifteen women.

The peeling machines were the F.M.C. "live knife" type, and they did a really wonderful job, giving an average yield of 78%. This machine has improved its performance immensely since the writer saw it first in Australia three years ago, and it is somewhat saddening to think that, with one exception, nothing of their like is used in our country. All that remains now is for the Italians to turn over to the machine, and then we will be completely isolated.

Mendoza

It is a long journey from the Rio Negro to the State of Mendoza. Eighteen hours sitting in a bus traversing roads which sometimes are not much better than mountain passes, or alternating with "dust roads" for want of a better word, does not encourage the idea that Mendoza is the place for peaches, but indeed Mendoza is an oasis after the desert.

Whereas Rio Negro has a very low relative humidity, the State of Mendoza has a much higher one, and conditions are ideal for apricots, peaches, grapes and tomatoes, and canneries are clustered around San Martin and San Rafael dealing with all the bountiful crops. Very few pears are found in this area, but peaches grow in profusion.

Peaches

Here again the same trend to modernisation was seen, and in one plant all the old-fashioned peach pitters were set aside, and ten new dual-feed, self-aligning pitters installed. Once the teething troubles were overcome, a daily throughput of 12,000 bushels was a regular feature.

Here again, the tremendous increase in output drew delegations from other plants, and it is obvious many more machines will be installed next year. With these machines at their disposal, the canners will now look for increased outlets, and crown pack peaches in 5-kilo cans will soon be a competitor to the Spanish producers. So far as the consumer pack is concerned, there are many brands in Argentina with which we are not familiar, and whilst a few have been seen in this country, we may expect a sharp step-up in brands and quantities.

Marmalade

All the canneries visited had marmalade and dried fruit outlets in addition to normal canning. Marmalade in Argentina is not to be confused with our traditional make, as it may be apricot, peach, plum, quince, pear and quince, or in other words—jam.

Huge vacuum boilers were used mainly, and indeed, the "marmalade" set-ups were most impressive and streamlined throughout. The fruits were washed, preheated, pulped, and carried to the boilers automatically, whilst the sugar was measured and elevated simultaneously with the fruit. After the proper boiling time, a refractor test was made for solids, together with an acidity test. It would be invidious to compare the operations with our methods, as the fruits are so completely different, but the products are very good.

Dried fruit

At some of the canneries, peaches and plums were being dried in the open air. One of the hazards of this method in Mendoza is the prevalence of thunderstorms and heavy rain, which, if lasting long enough, necessitates re-processing of the fruit.

Huge areas, some of them three times the size of a football field, can be seen covered with trays of yellow peaches and red plums, and the sight of women draped in large hats for protection against the sun is reminiscent of the rice fields of the East.

Whereas it may take an average of one week to sun-dry fruit, one plant also had a drying unit which dried plums in 16 hours at temperatures around 150-158°F. Before drying, the plums were washed and spread on mesh trays on wooden frames.

Only the small peaches are dried, and here the operations are lye-peeling, then spreading on trays, sulphuring in chamber for 20 minutes, then placing out in the fields. After drying sufficiently, the peaches were then brought into the de-stoning shed, where a rather primitive machine was used to remove the stone and press the peach simultaneously. This primitive machine will be replaced next season in some plants by a more modern, high-speed machine. Following on these operations, the fruit is then packed into wooden cases or cartons, depending upon the ultimate destination.

Tomatoes

Tomato canning is carried out on a grand scale in both Rio Negro and Mendoza, being canned whole, chillied, pulped, or used for sauce manufacture. The tomatoes are not like the ones normally seen in this country, there being two distinct types, the pear-shaped, and the squat.

The pear-shaped ones are used mainly for canning as whole, peeled tomatoes, in consumer packs. The first operation is that of washing the tomatoes, followed by a rigid inspection for defects. This is a vital operation, as the quality of the pack depends on the skill of the inspectors in rejecting at high speed.

Such tomatoes as are rejected are not trimmed by the inspectors, but dealt with by other operators, who trim where necessary, and pass the trimmed tomatoes to a conveyor leading to the pulp line. The first-grade tomatoes then pass through a steam blancher which has the effect of breaking the skin, then through a cold water spray to facilitate handling by those women slipping off the skin, then packing direct into the cans.

Some canneries use the hand-pack filler, but in this case the tomatoes get more rough usage.

In a first-grade pack, only whole tomatoes are packed, but some canneries do a lower grade by adding some pulp.

Apples

An interesting machine seen in Mendoza was the F.M.C. apple-peeler and slicer. Unfortunately, the slices were on the round, not the vertical, but the writer was given to understand a machine has been developed which will peel, core, and slice vertically, at a rate of 50 apples per minute.

If this be the case, it would certainly prove a boon to those canners who produce solid pack apple slices. The machine seen was operating on apple rings for drying purposes, and was certainly very efficient.

Conclusions

Argentina is a big country with a small population, and has many problems to overcome, not the least of which is transportation. Roads in many parts are in name only, and millions of pesos need to be spent on them, but this is being tackled, and once this is done the movement of raw materials and finished goods can be speeded up enormously, and many of the headaches of the canning industry, indeed all industry, will be solved.

Development of shipping ports, other than Buenos Aires, would benefit Rio Negro, but as was stressed in many discussions the writer had, there are certain priorities in Government spending, and each problem must take its place in the queue.

Given freedom from internal troubles, there must be a great expansion in the canning industry of Argentina, and within a few years it will be a common sight in our shops to see fruit packs, such as pears, peaches, salad and cocktail, ranged alongside our own and those from Australia, South Africa, Spain, California, to name only the well-known sources of supply. Can-making plants exist now in Buenos Aires and Mendoza, and it is only a matter of time before one exists in Rio Negro, and if a company like the Food Machinery Corporation decides to establish a plant in Cordoba, the potential certainty exists.

One thing which stood out during the visit was the child-like enthusiasm to learn modern methods, and the rapidity with which the operators picked up the training. The people want to work to earn money, not for luxuries, but for things we take as commonplace, and, given the proper encouragement, will put Argentina in its proper place so far as fruit canning is concerned.

Food Directory

WITH the present volume this biennial reference work* reaches its fifth edition, but this is the first to bear the present amplified title. The structure of the fifth edition remains as before. The main sections are Food Manufacturers, Commodities, Plant and Equipment, Packaging Materials, Brand Names, Food Laws.

Other sections of the directory give information about Government departments, food research organisations, trade associations, schools and colleges with full-time specialised courses in food technology, and a list of consultants.

A new feature is the inclusion of a list of food processors holding a Royal Warrant of Appointment. Such appointment is also indicated in the entries of the individual companies. The four main sections are divided into two parts, one giving the names, addresses, and telephone numbers, and the second a classified list of the materials or products.

The changes of pattern within the industry through the regrouping and amalgamations of food processors, which were noted in the last edition, have continued; but no fundamental reorientation has emerged.

An important, and much appreciated, section of the directory is the summary of food standards and regulations throughout the world. This feature has been prepared, as heretofore, by C. L. Hinton, F.R.I.C. It includes new sub-sections on Iran, Jamaica, Nigeria, Sarawak, Tunisia, and the U.S.S.R. The U.S.A. entry now includes a comprehensive tabulation of food additives. As many of these will be subjected to legislative review, the attention of readers is directed to the accompanying comments.

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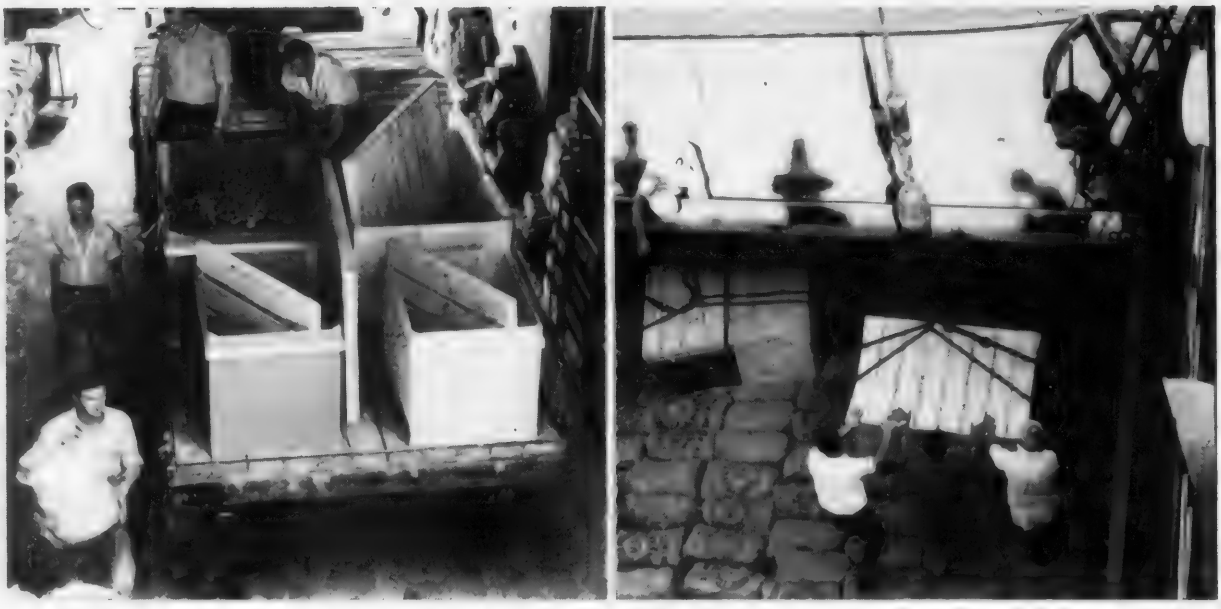
* *Food Processing and Packaging Directory, 1961-62.* Edited by R. De Giacomi, F.R.I.C. Tothill Press, London, 1961. Pp. 917. Price 60s. (62s. post free).

Ergonomics in Industry

OVER 300 delegates from industry, the trade unions, universities, research associations and government departments attended the three-day D.S.I.R. ergonomics conference in London last September. The Proceedings of the Conference, recently published,* include all the papers and a verbatim report of the delegates' discussions.

Ergonomics, the scientific approach to the problem of fitting the job to the worker, tries to improve industrial efficiency by designing equipment so that its operation is within the mental and physical capacities of the average person. The purpose of the conference was to bring ergonomics to the notice of senior people in industry, and to provide an opportunity to discuss its wider implications—in particular where ergonomics fits in with the interests of production engineering, equipment design, work study and industrial health.

* *Proceedings of Conference on Ergonomics in Industry, September 27-29, 1960.* Published for D.S.I.R. by H.M.S.O., London, 1961. Price 12s. 6d. (by post 13s. 4d.).



(*Left*): **New potatoes being packed in a Jersey warehouse into 5 and 10 cwt. plywood and hardboard bulk containers, and (*Right*), being shipped, during experiments carried out by the P.P.D.A.**

Bulk Containers for Produce save Money

THE Produce Prepackaging Development Association has, under the sponsorship of and with the full co-operation of the States of Jersey Department of Agriculture carried out satisfactory transportation tests with new potatoes in bulk plywood and hardboard pallet bins by sea and land.

It is claimed that this trial is the first shipment of immature potatoes by this method in Europe.

During the past season two consignments of 6 tons each, packed in 5 cwt. and 10 cwt. non-returnable pallet bins by wholesalers in Jersey, have been shipped to Portsmouth and transported by road to Southport and Ely.

Thorough investigations by P.P.D.A. technical staff into the condition of the potatoes and bins upon arrival at their destinations were carried out; the reports indicated that the potatoes travelled exceptionally well, little heating up occurring even in the 10 cwt. bins. There was little bruising and no excessive skinning. The incidence of blight, which was very low throughout the experiments, showed no increase over that shown by control samples packed in barrels and sacks. Whilst the cost of the bulk bins, made to an experimental quantity, is relatively high, labour costs in handling at the merchant's packing station in Jersey, loading and unloading at quaysides, road transport and at the prepackaging station on the mainland are considerably reduced. Furthermore, it is anticipated the bins can be utilised as storage containers at their destination.

These interesting tests supplement pioneer work previously undertaken by the Association in Jersey, Pembroke, Cambridge and other areas on the prepackaging, washing and drying of immature potatoes since 1955.

The first stage has proved that these bulk bins are technically capable of carrying the potatoes in a sound condition.

The Association is now studying all aspects regarding the costs of materials, and labour, as well as the techniques to be used if this type of container is adopted in the future.

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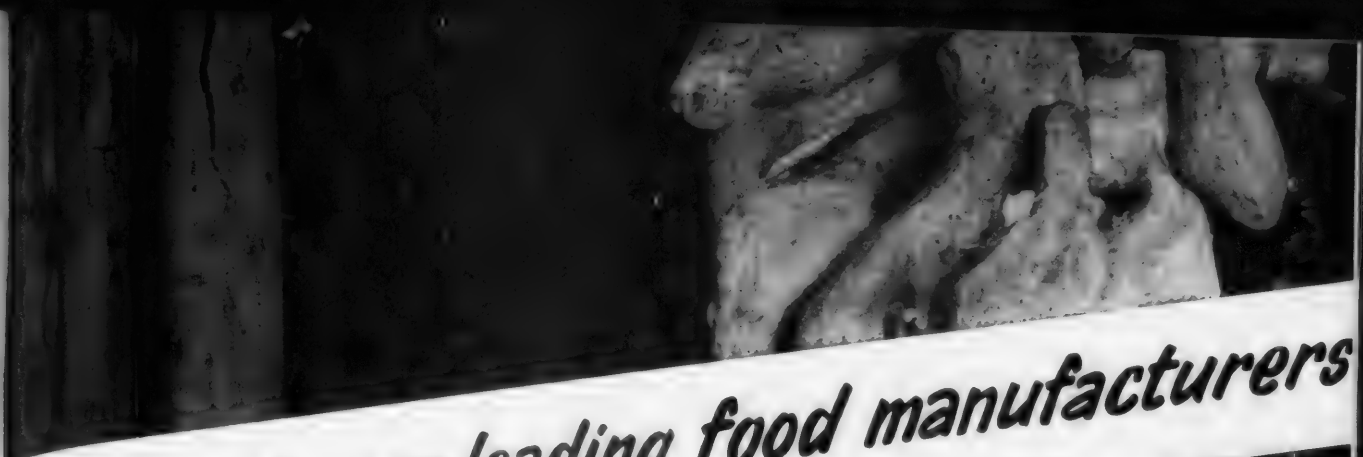
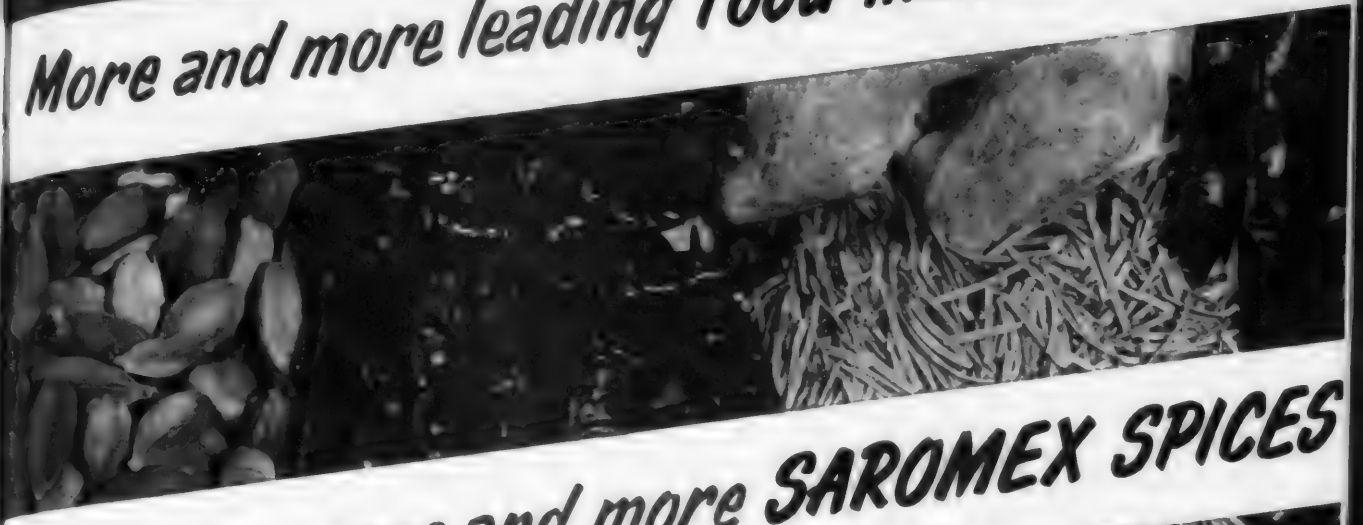


More and more leading food manufacturers



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Food Transport Developments in U.S.A.

Liquid Nitrogen

for low-cost truck refrigeration

By Peter W. Sherwood

Those with the problem of keeping frozen food at correct temperature during transportation may find that liquid nitrogen offers a cheap solution.

LIQUID nitrogen is about to join the growing list of non-mechanical refrigeration systems for food trucks. Data developed independently by Linde Company, Liquid Carbonic Co., Liquefreeze, and the U.S. Department of Agriculture indicate that liquid nitrogen in this service is safe, reliable, and potentially economical.

The field of possible application is large and growing. In 1959, some 75 billion lb. of food were shipped by refrigerated rail, trailer, or truck. Almost all of the units employed mechanical refrigeration; frequently inefficiencies in the system caused food spoilage resulting in losses worth millions of dollars.

Pressure is on for conformance to stricter code in refrigerated trucks. The Association of Food and Drug Officials of the United States (AFDOUS) requires that frozen food in transit be held at or below 0°F. at all times. The code is being adopted and enforced by a growing number of States, though some permit cargo space temperatures up to 10°F.

To meet the more stringent requirements, food packages are aiming at lower truck loading temperatures, preferably −5 to −10°F. Truckers themselves are taking steps to have truck doors opened as little and as briefly as possible.

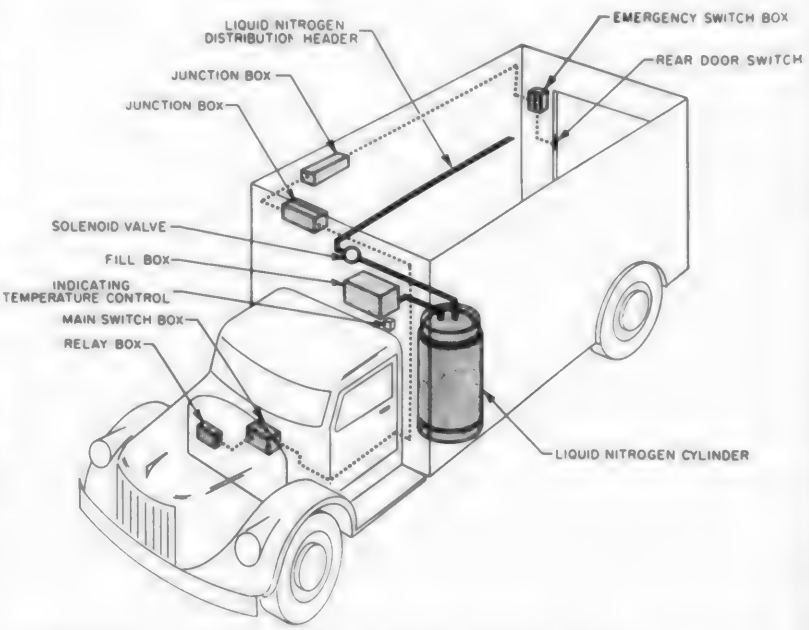
Refrigeration and cargo space equipment in the trucks is undergoing close scrutiny. Among the possibilities: (1) Upgrade refrigeration equipment to meet code requirements—a step expected to cost the industry $750 million and to require junking of $150 million worth of equipment. (2) Switch to larger, compartmented trucks. (3) Use more extensive and more efficient insulation. Already a trend is noted towards larger mechanical refrigeration units, as 7½-ton units replace 5-ton refrigerators as best-sellers to frozen-food trucking equipment.

Growing attention is being given to non-mechanical refrigeration. Three refrigerants are involved: solid carbon dioxide (dry ice), liquid carbon dioxide, and liquid nitrogen.

Solid and liquid CO_2

Illustrative of dry ice methods of cooling is the system developed by Dri-Freeze. It consists of two bunkers, each of which holds 900 lb. of dry ice. The bunkers are surrounded by jackets containing methylene chloride which is circulated through aluminium panels lining the side of the truck or trailer.

Liquid carbon dioxide must be handled under pressure (200-222 p.s.i.). In systems developed by Liquid Carbonic Division and Pure Carbonic Company, liquid carbon dioxide is used in conjunction with mechanical refriger-



This liquid nitrogen truck cooling system devised by the Linde Co. is noteworthy for the simplicity of the controls.

In trucks cooled by liquid nitrogen full use may be made of the cargo space.

ation to pre-cool trailers and cool hot spots in the cargo space. Estimated extra cost is $15 per trailerload.

Liquid nitrogen

The same approach may be taken with liquid nitrogen. However, systems recently developed which use liquid nitrogen to do the entire refrigeration job may serve to convert almost any truck or trailer at low investment cost. Key cost is the price of nitrogen; to cut its consumption, good insulation is called for.

Two systems of nitrogen-cooling frozen-food trucks are currently attracting special attention: (1) Isbandtsen's *Liquefreeze* in which liquid nitrogen, held in a pool in the bottom of the trailer, gradually evaporates into the cargo space to keep temperature well below zero. (2) Linde Company's *Polarstream* in which liquid nitrogen, stored in tanks at 15 p.s.i. is sprayed into the cargo compartment through pipes. The spray is actuated by thermostatic control valves.

A cost comparison of the non-mechanical cooling systems seems to favour liquid nitrogen for large trucking operations.

Liquid nitrogen, sold on a sliding scale, may vary in price from 2 to 8 cents per lb., depending on quantity used. By comparison, typical price of solid carbon dioxide is 4 cents per lb. and liquid carbon dioxide sells for about 4½ cents. But liquid nitrogen has a refrigeration capacity of only 160 B.T.U./lb., while solid CO_2 has a theoretical cooling effect of 250 B.T.U./lb. Liquid carbon dioxide provides 120 B.T.U./lb.

Thus, on paper, solid carbon dioxide appears to have a cost advantage over liquid nitrogen. Proponents of nitrogen-cooling point out, however, that it is difficult to control refrigeration rate of solid carbon dioxide and that investment and handling charges in liquid nitrogen refrigeration systems are significantly lower. Furthermore, long-range costs of liquid nitrogen at major use centres may be reduced by piping the product from the producing plant, storing it at the user's plants in vacuum insulated storage tanks at or neat atmospheric pressure.

A cooling system similar to Linde's *Polarstream* has been tested in service by the U.S. Department of Agriculture. For this system, which involves spraying of liquid nitrogen at a temperature of −320°F. on to the load of frozen food, the following key conclusions were reached: time required to cool the inside of the truck is virtually eliminated when compared with conventional systems; the temperature of the cargo was kept below 10°F.; even distribution of the cooling medium is possible with considerable reduction in the number of hot spots.

Cargo may be loaded to the ceiling with minimum provision for gas circulation because liquid nitrogen, which expands 700-fold when it flashes into gas, will force its way into every available void.

Safety aspects of liquid nitrogen

In any such systems, the question of safety is a paramount consideration, and here, too, liquid nitrogen seems fully acceptable. Certainly, the gas is non-toxic, and will not affect the food with which it is in contact. However, precautions must be taken to prevent contact by persons with liquid nitrogen (at −320°F.) and to avoid smothering of the driver in an atmosphere of nitrogen.

Fairly simple steps can avoid both of these possible dangers. For the loading and handling of liquid nitrogen, it is necessary to wear gloves and goggles. To prevent spraying of liquid nitrogen on the driver while he is in the trailer, the system is disengaged as long as the trailer doors are open. A safety switch is provided just inside the door against the possibility of the doors being slammed while the driver is inside. Furthermore, the entire system can be deactivated by a switch in the cab.

When the doors are opened, air will displace nitrogen so rapidly that the operator can enter the insulated cargo department almost immediately without danger of ill effects.

Costs

Investment in the nitrogen refrigeration is low and maintenance is negligible since no moving parts or corrosion problems are involved. Key cost is the liquid nitrogen itself. As we have indicated, its cost ranges from 2 to 8

(*Continued on page 482*)

The Pineapple Industry of Hawaii—II

Processing of Pineapple Juice

By W. V. Cruess*

Last month's article described the growing, harvesting and canning of Hawaiian pineapple. This month the author, who recently saw the Hawaiian pineapple industry at first hand, describes the extraction and processing of pineapple juice, how waste products are utilised, and some products obtained from this fruit, which is worth $125 million to the growers and processors of Hawaii.

ACCORDING to the statistics published by the pineapple companies of Hawaii the pack of pineapple juice in Hawaii for 1933 was only 776,000 cases. For the 1958-59 season it was 20,719,690 cases and for 1959-60 it was 16,852,358 cases; these totals also included concentrated juice calculated in terms of the unconcentrated juice.

Concentrate produced in Hawaii is exported to the mainland for use in various juice blends such as pineapple-grapefruit and others and in "fruit drinks" (really fruit ades) containing added sugar and water. These ades have become important products in the last three years.

How juice is obtained

Pineapple juice is commonly obtained from several sources in the cannery. These include juice obtained by pressing the eradicator meat (scrapings) from the ginaca machines; by pressing the cores, trimmings and broken pieces from the trimming line and the canning tables; juice obtained by pressing fruit that is too small for slicing; juice that is drained from the crushed pineapple; that which is drained from the cylinders of peeled fruit at the trimming tables; and that from the sliced fruit at the canning tables. Some of the juice obtained by draining is sent to the by-products syrup plant instead of to the beverage juice department.

The solid raw materials such as the broken pieces, slices that are too thin or too thick for canning, and eradicator meat are first inspected and unfit material removed. They are then coarsely shredded by machines designed for this purpose and a second comminution usually follows, such as by passage of the coarsely shredded material through a Rietz disintegrator. The small fruit used for juice is peeled before shredding or crushing.

The juice is pressed from the finely ground material by a special screw press such as the Schwartz extractor consisting of a powerful vertical member that revolves against a serrated surface and a fine screen that separates the juice from the pulp. The F.M.C. drum-type extractor has an elliptical rotating drum in place of the usual screw rotor. The shredded meat is pressed by the drum against a fine screen. An adjustable plate at the outlet controls the degree of extraction and a double screw forces the meat into the pressing section.

In most plants the raw material is not heated before pressing, as it is believed that much of the aroma and flavour is lost by heating. However, extraction is facilitated by heating and according to Mehrlich (1954) it has been applied in some plants.

The Wilmes press employed for pressing crushed grapes could be used for pressing pineapple meat, but its capacity is probably too low for this purpose.

Extracting and blending the juice

The juice at this stage contains considerable fibre, especially from the cores, and other solid particles. The coarser suspended solids are removed, if necessary, by screening the juice. It is heated to 140-145°F. in a continuous pasteuriser before screening; the heating coagulates certain colloids and thus facilitates screening.

In some plants the hot, screened juice is next passed through a continuous centrifugal which removes most of the remaining suspended solids, mostly fibre; or in at least one plant (Dole, Hawaiian Pineapple Co., Ltd.) it is "defibrinated" by passage through *Dorrclone* separators. These are small, vertical, pear-shaped vessels through which the juice travels downward in whirling fashion and out the bottom of each unit; the solids collect on the walls and travel upward and out. The walls are stationary, the juice moves. Good separation is secured if the juice has been heated. The cores are the principal source of fibres. The press cake is usually broken up and pressed a second time. The final press cake is dehydrated for stock feed. In one plant the pineapples too small for slicing are cut in half and pressed in a continuous *Citromat* juice extractor similar to that used for citrus

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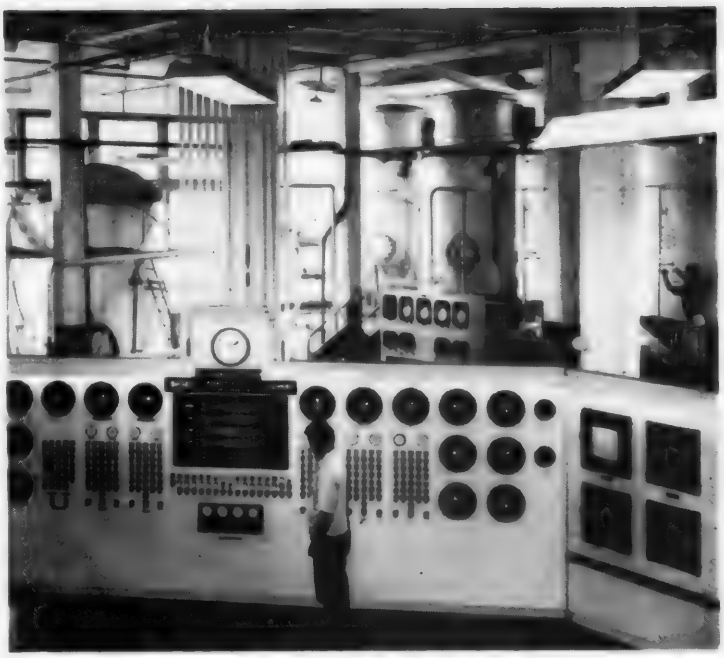

A section of the processing plant of the Dole, Hawaiian Pineapple Co., showing control panel in the foreground and ion exchange tanks in the background.

fruits in California and Florida.

The juices from various sources are blended in a tank, the object being to produce blends that are of fairly uniform Brix degree and total acidity for a given period. The juice from fruit harvested in late fall and winter gives juice that is of higher acidity and lower Brix degree than that produced during the principal season, that is the summer months.

According to W. B. Thomas of Libby McNeill and Libby Co., the acidity of the juice from winter harvested pineapple is in the range of 0·75 to 0·90 g/100 ml. expressed as citric acid and about 0·20 g/100 ml. lower in the juice from summer harvested fruit. According to Cameron and Esty (1950) the total solids (Brix degree) in the samples examined by them varied from 12·9 to 17·5% and averaged 15·1%.

The National Canners Laboratory in Berkeley, California, reported in 1941 that a typical analysis of canned pineapple juice showed total sugar as invert 14·0%, total acid as citric 0·60%, ash 0·6% and protein 0·3%.

The juice may or may not be homogenised by a machine similar to that used for milk, the object being to break up the small suspended particles into still smaller size, thus improving the stability of the slight cloud. The juice as canned contains enough finely divided solids to impart a slight cloudiness or haze. These solids are believed to increase the flavour and improve the body of the juice.

Pasteurising

The juice is pasteurised in one of two manners. In one it is heated to 190-195°F. in a continuous flash pasteuriser such as the APV plate-type pasteuriser, canned hot, the cans being rolled for about 1-3 min. to sterilise the lids and walls of the can, and then very rapidly cooled in a continuous spin or other type cooler.

In the second method the difibrinated juice is filled into cans at about 140°F., the cans closed and then pasteurised in a standard reel and spiral cooker to give an interior juice temperature of about 190°F. The cans are then rapidly cooled. This second method is thought by some canners to result in less loss of aroma and flavour.

Cameron and Esty (1950) have given the carotene content of canned pineapple juice as from 0·01 to 0·04 mg./100 g. and the average as 0·03 mg./100 g. in samples examined by them. Ascorbic acid ranged from 3·2 to 14·2 mg./100 g. and averaged 8·5. This is much lower than the ascorbic acid content of citrus juices or of guavas or acerola cherries of Hawaii.

Flavour and aroma constituents

Haagensmit and colleagues at the California Institute of Technology of Pasadena, California, in 1945 and 1946 studied the volatile compounds of pineapples by subjecting large samples of minced fresh Hawaiian pineapple of the smooth Cayenne variety to vacuum distillation at not above 104°F., collecting the volatised fractions by condensers and distillate traps held at low temperatures; and analysing these condensates. Summer fruit was found to be higher than the winter fruit in volatile flavouring and odorous constituents.

The esters of the summer fruit were predominately ethyl esters and those of the winter fruit usually methyl esters. Ethyl acetate, acetaldehyde, methyl isocaproate, ethyl alcohol, ethyl isovalerate, ethyl acrylate, ethyl N-caproate, and sulphur containing compounds were among the volatile compounds identified.

As would be expected, addition of the volatile substances to a water solution of sugar and citric acid does not give a product that closely resembles pineapple juice in flavour and odour. Flavour and aroma are due in part to fixed non-volatile compounds and to compounds present in trace amounts.

Among the compounds boiling above 212°F. (100°C.) were acetic acid, a sulphur containing compound and esters of a C_5 unsaturated acid. Other taste affecting fixed compounds are citric and malic acids, salts of fixed acids, etc.

The volatile constituents of the juice concentrated commercially

by quadruple effect vacuum concentration are fractionated and condensed at low temperature in the large canneries in Honolulu and used in reinforcing the flavour of concentrates, pineapple baby food and beverages.

Much of the juice is now concentrated by quadruple effect vacuum pans into concentrate used, after diluting back to beverage strength, in various blends and in juice drinks (bottled or canned ades). (*See later section on this product.*)

JUICE FROM BY-PRODUCTS

By-products of the pineapple industry come from two sources, namely, the pineapple plants after harvest of the ratoon crop and secondly from the fruit itself during commercial canning operations. The leaves and stem can be cut into short lengths and air dried for use as live stock feed; although they are usually utilised in other ways. For example, they are knocked down by heavy discs, cut into short pieces by disc and ploughed under as a soil improver. Over 100 tons per acre of such material is not unusual. It is allowed to decompose in the soil for several months before replanting.

Recently, as previously mentioned, the Pineapple Research Institute has found that an excellent ensilage for dairy cows can be made from the plants after harvest of the final ratoon crop. (*See section on the P.R.I.*) There is a ready market to dairies in the Islands for the product. Dr. Cushing, director of research of P.R.I., states that this method of utilisation has aroused great interest in the pineapple and dairy industries and bids fair to become industrially important.

In one of the large canneries the waste stalks (stems, butts) on which the leaves and fruit have grown are being investigated on a pilot scale for the production of the enzyme bromelin. Results have been very promising and it is expected that commercial production will be undertaken soon. The enzyme would be used, not only as a meat tenderiser, but also in pharmaceutical preparations, and in other ways in which papain, the enzyme at present made commercially from papaya tissue, is used.

Processing the waste

The waste shells (skins), ends and other wastes constitute about 30-40% by weight of the fruit as it enters the cannery.

Two of the large canneries (Dole, Hawaiian Pineapple Co., Ltd., and Libby McNeill and Libby) in Honolulu utilise the waste shells (skins) and fruit ends from the ginaca machine for the production of a syrup used in the canning of sliced pineapple and other canned pineapple products. The other large cannery (California Packing Corporation) uses this waste for the production of alcohol to be used in the production of distilled pineapple vinegar.

At one time juice was expressed from this waste material, partially neutralised with calcium carbonate at or near the boiling point, the resulting insoluble calcium citrate recovered by filtration and citric acid obtained from the citrate by acidification from sulphuric acid, filtration, concentration and crystallisation, as in recovering citric acid from lemons. The partially deacidified pineapple juice was then treated with activated carbon to remove colour and some other compounds. The treated juice was filtered, concentrated *in vacuo*, sweetened with cane sugar, and the resulting syrups were used in making up syrups used in canning of pineapple. However, it was found that the canned product, while satisfactory for a while after canning, eventually developed a slightly disagreeable flavour.

Some of the waste material was concentrated for use as cattle feed and the remainder was sent through the sewers into the ocean. In addition to the obvious loss of sugar this procedure caused problems in sanitation and waste disposal. On that account the Dole Hawaiian Pineapple Co., Ltd., discontinued this practice in 1930. Attempts were made to remove the impurities responsible for the flavour change. These included phosphate treatment and conventional sugar refining methods, but none of these treatments were satisfactory.

Beverage juice was then used in the syrups employed in canning pineapple products and this procedure proved fairly satisfactory technologically but was not very economical financially.

Refining by ion exchange

In 1941, at the suggestion of Jas. Dole of the Hawaiian Pineapple Co., and in co-operation with the Chemical Process Co. of California, research was undertaken on the use of ion exchange resins for refining the juice. Sample packs of pineapple canned in syrups made by the ion exchange procedure showed excellent shelf life and were of excellent flavour. With the co-operation of the Illinois Water Treatment Company of Rockford, Illinois, a pilot plant was built and put into operation. The author is indebted to the article by Dr. George Felton on the production of syrup by the ion exchange procedure.

Sugar recovery

The present commercial installation was designed for the Dorr Co. of New York in close co-operation with engineers and chemists of the Hawaiian Pineapple Co. Its original cost was about $750,000 and it was put into operation during the peak of the summer season in 1947. More than 6,500,000 lb. of sugar equivalent were recovered each year during the first three years of operation, according to Felton (that is, the syrup produced contained this amount of sugar).

The resulting syrup was used with cane sugar and water in making up syrups for the canning of sliced and other pineapple products. According to one of the research staff members about 6,000 tons, or about 12,000,000 lb. per year of sugar equivalent is now recovered in the ion exchange plant at present. This is about 30 lb. of sugar equivalent for each ton of fresh pineapple.

Dr. George Felton directed much of the research and development on the ion exchange process for the Hawaiian Pineapple Co. and is still very active in research. (See particularly his paper, "Use of ion exchangers in by-products recovery from pineapple waste" in *Food Technology*, 1949, **3**, 40.) The engineering department of the company also participated to an important degree.

The procedure as observed in plants in Honolulu in December, 1960, was as follows. The shells and ends from the ginaca machines were broken up into small fragments and juice extracted by Rietz disintegrators. The resulting semi-fluid mixture was heated in continuous heat exchangers to about 145°F. to coagulate certain colloids that would interfere with pressing. The unheated mixture is very difficult to press and gives a low yield of juice, according to Thomas of the Libby McNeill and Libby Co. The heated material is pressed in vertical screw presses similar to the well-known F.M.C. tomato press in appearance.

The presses used by the Hawaiian Pineapple Co. are made exceptionally sturdy according to the company's design and specifications. The press cake is broken up and sent to the continuous direct-fired drum dryers, in which it is dried "bone dry." The resulting "bran" is sacked and sold for cattle feed. There is a good demand for it from the dairies in the islands.

The "mill juice," prepared as above, is screened to remove coarse fragments of shell, etc., and is then heated to 190-200°F., mixed with infusorial earth filter aid and is filtered by use of an Oliver type, precoated, continuous filter. The precoat is infusorial earth filter aid.

Refining procedure

The filtrate is then cooled and sent to the refining department. According to Felton (1949), Cruess (1958), and recent observations at the plants, the procedure is then as follows. The juice is treated with lime at about 190°F. to precipitate most of the citric acid as calcium citrate and bring the *p*H to about 5·3. The precipitate is recovered by filtration by filter press and citric acid is recovered by the procedure used for the making of citric acid from lemons. The partially deacidified juice is cooled in a heat exchanger.

The juice next enters the first cation exchange resin tank which is about 10 feet in height and 10 feet in diameter, and filled with cation exchange resin C-3 of the Chemical Process Co. of California in the Dole, Hawaiian Pineapple Co. plant. Exchange resins are obtainable also from the Rohm and Haas Co. of Philadelphia. The juice first displaces the water in the resin, a procedure known as "sweetening on."

Most of the metallic ions (cations) such as those of potassium, sodium, calcium, and others, are absorbed by the resin. Some colour is also removed, but much less than by the anion exchange resin later. The treated juice is very acid in reaction, its *p*H at first being about 2·0. With use of the column the *p*H increases somewhat. It is next passed through the tank of anion exchange resin.

The anion exchange resin, *Duolite* A-3, in the Dole plant, removes most of the natural organic acids (citric and malic) and other anions, the emerging juice being slightly alkaline at a *p*H of about 10. Second treatment in a second pair of cation and anion tanks is given, the treated juice from the anion resin being faintly alkaline. A small amount of juice from the second cation treatment is added to bring the *p*H value to about 8·0. The juice from the second cation treatment has a *p*H of 3·0 to 3·5.

There are five pairs of exchange resin tanks. Thus, while one pair is in use others can be regenerated. According to Felton the spent resins are treated with strong sodium chloride solution which dissolves most of the absorbed calcium from the cation resin and the citric and malic acids from the anion resin. Heating of the brine after its passage through the anion exchange tank will precipitate calcium citrate which can be removed by filtration and utilised for the recovery of citric acid. The cation resin is washed with water to remove excess chloride solution and is next

A battery of ginaca machines at the Dole, Hawaiian Pineapple Co.'s plant.

treated with dilute NaOH or dilute NH_4OH solution to remove absorbed colouring matter, etc., and is then washed with water. It is next treated with dilute H_2SO_4 solution and rinsed thoroughly with water to remove the H_2SO_4.

The anion resin is regenerated with 2% NaOH solution and rinsed free of NaOH with water.

The ion exchange process is controlled automatically from a central panel on which instruments indicate the exact condition of each tank. The panel contains flow controllers, flow rate indicators, conductivity meters, *p*H meters, a temperature recorder, density meter, and dials indicating the levels in all regenerant tanks. The various valves can be operated manually, if desired, but usually are automatically controlled. The valves, according to Felton, are Saunders type with rubber diaphrams operated by air pistons controlled by solenoid pilot valves actuated by relays on the control panel.

The treated juice is almost colourless and has a faint but recognisable pineapple odour. It is concentrated in a quadruple effect vacuum concentrator, the fourth effect or unit being a low-temperature vacuum evaporator operating at about 60°F. At this low temperature caramelisation and cooked taste do not develop. The volatile flavour fraction can be recovered by low-temperature condensation.

The juice may be treated directly without the preliminary step of partial de-acidification with lime and the citric acid recovered directly from the anion exchange resin.

In one plant much of the refined mill juice is concentrated to 65° Brix. As the ion exchange treatment removes most of the nutrients required by micro-organisms the 65° Brix syrup keeps well in metal tanks and much of it is so stored for subsequent use. Some of the refined juice is concentrated to 50° Brix only. Whether of 50° Brix or 65° Brix, it is mixed with syrups of cane sugar and water and the blended syrups are used in canning.

BEVERAGE CONCENTRATE

Beverage juice, not treated with exchange resins, is concentrated in the quadruple effect vacuum concentrators previously mentioned and the volatile constituents fractionated and condensed to give an "essence" of about 100 times the flavouring power of the fresh juice. The fourth effect of the concentrator operates at not above room temperature. This flavour concentrate is added back to the concentrate, or is used in pineapple baby food and in other ways.

Some of the beverage syrup is preserved by freezing storage or low-temperature storage. Much of it, however, is flash pasteurised and packed in hot No. 10 cans, which are seamed and cooled quickly by water cooling. It is exported in this form to the mainland.

The concentrate is flavoured with the concentrated essence mentioned above, this method of flavouring having been found superior to the addition of fresh juice to the concentrate, a method commonly used for frozen "3 plus 1" orange concentrate.

Many years ago a concentrated pineapple juice was made by freeze concentration. The juice was frozen to a slushy consistency and separated from the ice crystals by centrifuging, the procedure being repeated several times to give a concentrate of about 50° Brix. As far as the author is aware this product is no longer on the market.

Pasteurisation necessary

In the making of pineapple juice concentrate by any method it should be flash pasteurised before concentration to inactivate enzymes, particularly those responsible for undesirable changes in flavour during storage. However, if the concentrate is packed hot into cans the preheating inactivates the enzymes and additional pasteurisation is unnecessary. Judging from experience with other juices momentary flash pasteurisation at 185-190°F. followed by immediate cooling should be sufficient.

OTHER PINEAPPLE PRODUCTS

1. Alcohol for vinegar manufacture

The California Packing Corporation in Honolulu utilises the waste shells and ends for production of alcohol, which is exported to one of its plants in San Jose, California; there it is diluted with water and converted into distilled vinegar by use of modern vinegar generators operated on the submerged acetification principle. The vinegar is used in the production of cucumber and other pickles in addition to packaging and sale as vinegar.

The shells and ends from the ginaca machines are ground by disintegrator and pressed in continuous vertical screw presses, the press cake being dried as at the two other large canneries of Honolulu for sale as stock feed. Compressed yeast is used to inoculate the first tanks of juice of the season. Fermenting juice from one tank is used to inoculate the next and so on. If the yeast becomes weak or contaminated a fresh start with compressed yeast is made. The juice is not pasteurised or treated with SO_2 (as in grape wine making). Fermentation is extremely rapid. The fermentation is conducted in large tanks.

The fermented juice is first distilled in a continuous column still of conventional design to give a distillate of about 80% alcohol content by volume. It is then redistilled from a 20,000 gallon pot still through the customary dephlegmator and vapour condensing system used in the distillation of brandy to give a final distillate of 95% alcohol by volume. Only about 7,500 gallons is placed in this still. After distillation water is added to the residue in the still and distillation is repeated. This is repeated until the residue contains 0·06% or less alcohol. The author is indebted to Gordon Pickering of the C.P.C. staff for information on the alcohol plant.

The alcohol plant was designed and put into operation about forty years ago by Chas. S. Ash, chief

chemist of the company. He retired several years ago because of advanced age and recently died.

2. Diced pineapple

Canned diced pineapple is used in canned fruit cocktail produced in large amounts in California canneries. A special pack in No. 10 cans is canned for this purpose.

Some canned crushed pineapple (bulk, unsweetened pack in No. 10 cans) is put up for use by commercial jam manufacturers, pie bakers and others. Some is candied in sliced or tidbit forms for sale as a confection or in small dice form for use in mixed candied fruit mixes used in the home or in bakeries in cookies, cakes, etc.

Pineapple in sliced form or in smaller pieces may be dehydrated successfully, as experiments in the Food Technology Department of the University of California have demonstrated. Light sulphuring in the fumes of burning sulphur is advisable before dehydration in order to retain the fresh colour. The flavour of the dried product is very mild because the volatile flavouring and odorous compounds are lost in drying.

One company (Libby, McNeill and Libby) is now canning diced pineapple in syrup flavoured with peppermint, this new product being on sale in mainland markets. Various other new products are under study by industry members and by other research laboratories.

Pineapple in other regions

Pineapple is grown commercially and canned in the Philippines, Malaya, Mexico, Formosa, Puerto Rico, Brazil, Australia and South Africa. It is also grown in other tropical regions in India, China, Jamaica, Trinidad, Cuba, Venezuela and Colombia. See Collins, 1960, the Pineapple, Leonard Hill (Books), Ltd., London, or Interscience Publishing Co., New York, for information on pineapple production in these regions.

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Correspondence

A.F.D. Foods – "setting the record straight"

SIR,

Your recent editorial on A.F.D. products (*October*, p. 410), in which you refer to Armour's new products, I feel requires some comment. In the first place I would like to refer to a product made from shredded A.F.D. fish, mashed potato powder and other ingredients which when re-hydrated gave a fish cake. This was made as early as 1952 by a company trading under my name and was supplied for catering purposes. Very many hundredweights of this product were consumed, for example in the Michelin factory canteen. The A.F.D. fish supplies came from the M.O.F. factory at Aberdeen; the production of the fish-cake mix had to cease when commercial production of A.F.D. fish failed to materialise quickly enough.

Secondly, I would like to refer to a product test marketed in two British cities for many months by Petfoods, Ltd., which was A.F.D. fish steaks—it was named *Flick* and was sold for feeding to cats, though in fact it was perfectly suitable for human consumption.

My third point concerns a practice which might cause unfortunate impressions regarding the qualities of A.F.D. food if not carefully watched. One of the Armour packs is a chicken and rice dinner—the chicken is A.F.D., the rice is "instant" rice. The chicken is excellent, as would be expected; the rice is not nearly so excellent, again as would be expected. As the rice predominates in the pack an unfortunate overall impression is created. The same applies to the beef and vegetable meal, where the inclusion of non-A.F.D. potato slices, for example, in my opinion give a very poor impression.

I hope that this sets the record straight in this now not so new field of A.F.D. which at long last appears to be getting moving.

R. GORDON BOOTH,
19, Homewood Road,
St. Albans.

American Control is Not Wanted

SIR,

I was more than interested in your Editorial in the issue of FOOD MANUFACTURE for September, 1961, headed "Is the Americanisation of our Industry a Bad Thing?"

In my view you have said something which needed to be said for some considerable time. I personally view with considerable dismay the steady infiltration of American control into British industry, and I do think that the Trade and the public mind should be far more aware of what is happening than they appear to be at the moment.

The introduction of American capital to our industry is one thing, but American control is quite another.

R. D. MASON, M.SC., F.R.I.C.,
F.R.A.C.I., M.INST.F.,
Richmond, Surrey.

A quick look at some

Useful Instruments

for food processing

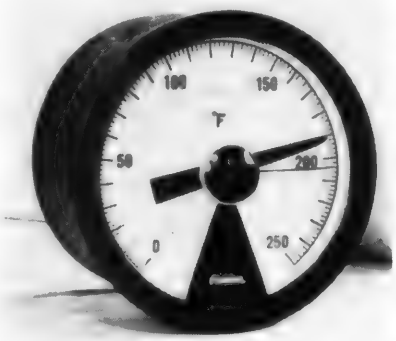
The food industry generally, with a few outstanding exceptions, is not to the fore in adopting instrumentation to help quality control and consistency of the product. Too many manufacturers, particularly the smaller, are content to jog along with primitive instruments or none at all and to try to produce high quality products with hope and faith rather than with accurate measurement. This of course is not the case in *your* factory, but nevertheless peruse this brief survey, it may give you an idea or two.

Pocket *p*H meter

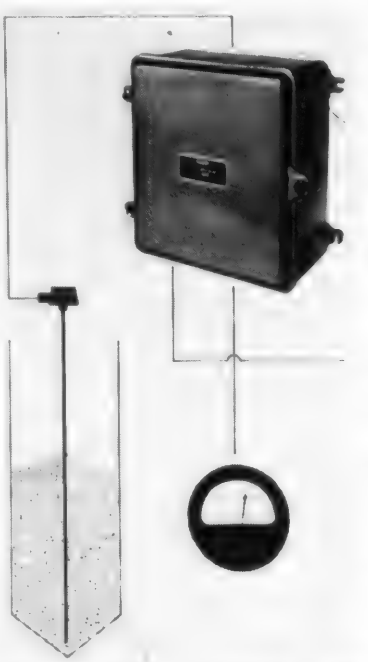
IDEAL for *p*H measurements and electro-titrations in the laboratory, or for industrial use by technicians who have to move from place to place, the pocket *p*H meter made by Cambridge Instrument Co., Ltd., weighs only 2¾ lb., takes isolated measurements in three minutes, and can be supplied with a shoulder-strap carrying case that has an extra compartment for the electrode and buffer solutions. Powered by dry-cell batteries with a life of approximately 1,000 hours, it has a simple concentric self-contained glass electrode system with a scale range of 0 to 14 *p*H and an accuracy of ±0·1 *p*H. A small plastic cup fits over the end of the electrode unit and serves to hold the standardising buffer or a small quantity of the sample to be tested. The instrument is simply switched on, standardised at *p*H 7 and is then ready for use.

Temperature control, indication and recording

The makers of the *Bikini* range of transistorised temperature controllers and indicators, Fielden Electronics, Ltd., say that although full production of these instruments began only a few months ago, several hundreds are now in use throughout the food industry. Suitable applications include: chocolate and sweet manufacturing, on enrobing machines, cooling tunnels, tempering machines, boilers, etc.; milk products, for refrigeration control and in the manufacture of malted milk; frozen foods, for temperature indication and control in cold storage rooms; on ice cream machines to control the stiffness of the mix; in margarine manufacture to indicate the temperature in a pipeline; in baking for oven control and on dough mixers; for jam boiler control and recording in preserve manufacture; in sugar manufacture; and on packaging and wrapping machines.



The Fielden "Bikini" temperature indicator/controller.



Fielden "Telstor" continuous level indicator.

The absence of pivots, galvanometers or other delicate mechanism makes these instruments very robust. They have a rapid response and are easily installed. They can be used at any distance up to 300 ft. from the temperature measuring bulb, no compensating adjustments being required. They are supplied in any of 73 temperature ranges with accurate Centigrade or Fahrenheit calibrations.

The same firm also make the *Tektor* level controller and the *Telstor* level indicator.

Level and contents gauges

A hopper level switch is made by Firth Cleveland Instruments, Ltd. This detects when the level of a granular or semi-solid material in a hopper has reached the height predetermined by the mounting position of the switch. It consists of an aluminium alloy housing which is mounted on the wall or sloping floor of the hopper, the inside face being sealed by a strong synthetic-rubber dia-

Pocket *p*H meter made by Cambridge Instrument Co., with concentric electrode, buffer solutions and compact satchel.

phragm, against which the material contained in the hopper presses. Deflection of the diaphragm displaces a spring-loaded plunger which in turn actuates a standard single-pole changeover microswitch. Presence of material against the diaphragm can therefore be arranged to open or close a circuit, for alarm or control purposes. The construction throughout is very robust in order to ensure maximum reliability, and the cover of the switch chamber is sealed by a gasket to provide weatherproof protection. The diaphragm completely seals the working parts from any dust or liquid in the hopper.

The same firm also make a vibrating probe type level control system designed to detect and give visual information the instant the liquid or granular content of a tank or hopper reaches a critical level. It can be connected to the tank or hopper feed system to initiate operation of an emptying or filling device. It consists of a probe unit which comprises the detecting device, and a control amplifier unit which comprises the control relay and lamp indicators. The method of operation is based on the principle that any material coming into contact with the vibrating rod of the probe unit will cause the vibrations to stop, so actuating a control relay. Interconnection of the units can be made up to a screened cable length of 300 ft.

Another Firth Cleveland instrument is the hydrostatic tank contents gauge of the pressure bulb type, which measures the head of liquid in almost any type of non-pressurised tank, wherever situated and regardless of height. The system is of the remote reading type, allowing the indicator to be placed in a position up to 250 ft. from the tank. It indicates either depth of liquid or tank contents by means of dial and pointer.

A conductivity probe type level control system also made by the firm is designed to detect and visually indicate the instant a liquid in a tank reaches a predetermined position, and operates on the principle that many liquids are electrical conductors so that the presence of a liquid between the probe detector and the metal surface of its housing completes an electric circuit which actuates a control relay.

Bin level control

A pneumatic bin level controller which regulates and in-indicates the level of materials in bulk storage containers is the *Bindex* level controller made by Henry Simon, Ltd. It consists of a small (about 9 in. cube) metal casing which houses a pressure-reducing valve, a pressure switch and an air motor. Outside the casing is a simple paddle (normally 16 in. long) which is connected to the air motor by a spindle. When the instrument is in position, the spindle passes through the side or top of the bin, the casing being outside the bin and the paddle inside.

The paddle is driven by compressed air and oscillates with a continuous see-saw motion, a movement which is hampered or stopped when the level of the bin contents reaches the paddle. Interference with the movements of the paddle immediately activates a pressure switch which operates a light, sounds an alarm or initiates controlling action to the equipment feeding or emptying the bin. The pressure valve can be finely adjusted to suit stock density to give instant reaction even on a material which offers little resistance to the movement of the paddle.

In dusty atmospheres, or where hazardous materials are being stored, all electrical parts can be positioned away from the site or, in some cases, replaced completely with pneumatic equivalents.

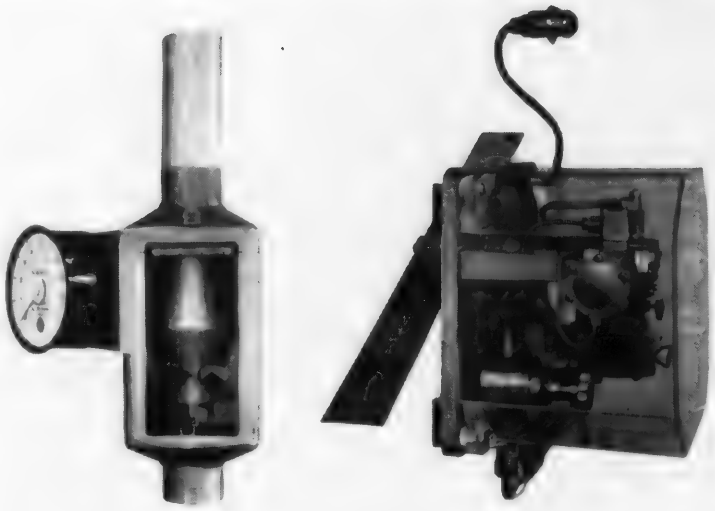
Continuous weight tester for wheat

Bushel weight has long been regarded as an important aid to quality control in the mill although the method of determination has remained virtually unchanged for centuries. Bushel weight has always been difficult to assess with precision, since the accuracy of the chondrometer is limited and continuous check is impossible.

The result of several years' research by Henry Simon, Ltd., in conjunction with Fairhurst Electronics, Ltd., is an electric device, the *Bushelmaster*. The makers say that prototypes of the equipment have been exhaustively tested under working conditions in leading mills, and have proved to be able to detect variations of 0·2% in the bushel weight of wheat passing through.

Basically, the *Bushelmaster* consists of a quart container or "bomb" through which the wheatstream continuously flows, at the same time actuating a precise automatic weigher. The movement of the scale beam is converted, through a patented transducer, into electrical impulses which move a pointer over a scale whose graduations are widely spaced: 3½ inches corresponds to a change in bushel weight of 1 lb. More important,

the transducer can also operate an electric strip-chart graphic recorded to give a continuous record of bushel weight.



(Left): **The Simon " Bushelmaster " for continuous and accurate determination of the bushel weight of the wheatstream.** *(Right)*: **The Simon " Bindex " for determining the level of materials in storage bins.**

Towards complete automation

Instrumentation for many quantities from a simple thermostat for a conditioning room in a brewery to a complete blending system for recipe selection and control in a canning or ice cream plant is supplied by Honeywell Controls, Ltd. For accuracy of temperature control in chocolate melters and in many other processes, there are electronic automatic continuous controllers. The same type of instrument is in use for scanning a larger number of temperature points automatically in an accelerated freeze-dryer. For product lines the *Thermos-couple* is a hygienic temperature element since it has no projections into the line.

Gravity measurement and control, so important in the brewery and elsewhere, may now be made continuously. The very high degree of accuracy often required makes electronic continuous controllers ideal.

This kind of instrument can be used in conjunction with the no-restriction magnetic flow meter, developed to permit measurement of numerous liquors. With this system liquids can be blended over a wide range of readily changed ratios and the quantities used may be continuously integrated. The existence of mass flow meters for granular or powdered products now permits accurate blending of solid and liquid materials; these mass meters can give signals to pneumatic as well as electronic recording or control equipment.

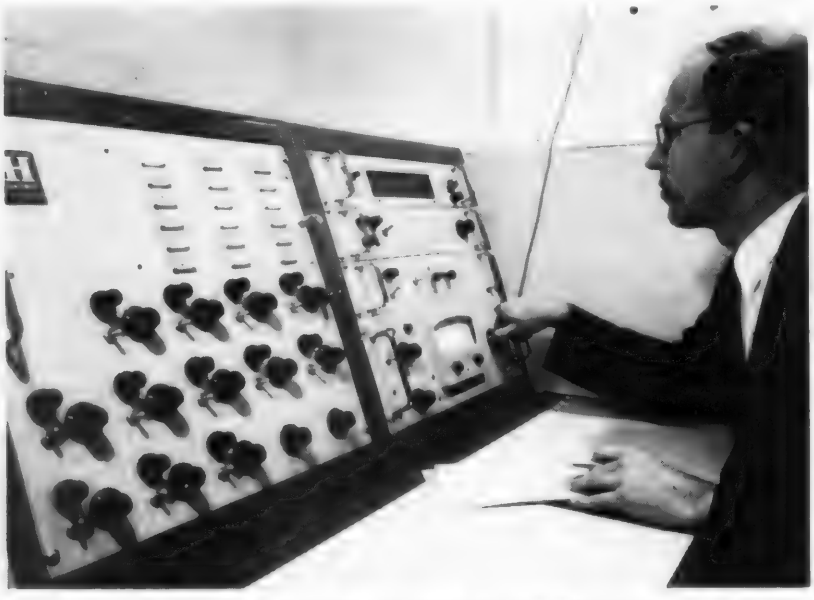
Pressure in process lines—using a seal to allow in-place cleaning—may be measured and controlled with electric or pneumatically operating instruments.

The *Moist-O-Graph* device enables the moisture content of a wide variety of food materials to be measured, so minimising wastage and drying requirements in many processes. It has been successfully employed, say the firm, in grain silos, flour mills, rice stores and elsewhere.

The quality of preservation of packaged foods may now be assessed at a glance by the new cigarette-size time/temperature integrator which is packed with frozen foods and gives a history of temperature conditions.

The simple *Versa-Tran* level relay finds many uses for signalling and controlling liquid levels in tanks, by giving alarms and starting and stopping process pumps.

In addition to the above the firm make a wide range of low-cost auxiliary devices such as pressure switches, temperature switches, solenoid valves, diaphragm-operated control valves, motors, etc.



Automatic ice cream recipe maker incorporating Honeywell analogue computer and electronic controller devices disposed about the plant. This installation is at H. D. Hood and Sons, Boston, U.S.A.

FOOD MANUFACTURE in Norway

Report on the Food Group Summer Tour

The S.C.I. Food Group Summer Tour, held this year from June 3-10, was centred on Stavanger, Norway. The Editor was a member of the party and here gives a brief report on the tour and lists the places visited.

AMONG the outstanding impressions brought back by the members of the S.C.I. Food Group who took part in the 1961 Summer Tour to Stavanger, Norway, from June 3-10, were the warm hospitality and friendliness of our Norwegian hosts and the high degree of small-scale mechanisation which has been achieved by the food industry of Stavanger and its environs. Stavanger is the capital of the province of Rogaland, Norway's principal agricultural and food processing region. The province is less mountainous and more fertile than the rest of Norway; agriculture, dairying and meat production therefore play an important part in the economy of the province.

Stavanger itself is an important port and a prosperous city of about 52,000 inhabitants. One important industry is of course fish catching and processing, but there are in addition in and around the city various food enterprises such as flour mills, dairies, meat processing plants, a soya-bean oil refinery, poultry breeding and egg packing stations, bakeries, and a margarine works. The party visited a representative selection of these, and also visited the Norwegian Fisheries Research Institute in Bergen.

In Stavanger is also the well-known research institute of the Norwegian Canning Industry, with its associated Canning School and Quality Control Institute. Here the party spent a very profitable morning, and also attended an evening meeting of the Rogaland Section of the Norwegian Chemical Society, which was addressed by Mr. E. Mathieson, director of the Research Laboratory of the Norwegian Canning Industry, who described the work of the laboratory and its associated Quality Control Institute and Canning School, and by Mr. T. McLachlan, chairman of the Food Group, who spoke on the historical development of public analytical work and discussed certain aspects of the Norwegian Canning Industry's products and processing techniques from the public analyst's point of view. The addresses provoked a lively discussion.

On arrival the members of the party were entertained to dinner at the Atlantic Hotel by the directors of the establishments visited during the week. This was an outstanding event; our hosts' informality and witty command of the English tongue helped to create a bond of friendship which will be remembered long after the details of plant and processing techniques have been forgotten, while the special song, composed for the occasion and sung lustily by our hosts, nearly brought down the restaurant ceiling.

Establishments visited:

1. Jaeren Meieri (dairy), Bryne

Bryne is about 15 miles to the south of Stavanger and here the modern dairy of Jaeren Meieri processes yearly about 22 million pints of milk from about 330 producers in the vicinity. Some of this is used for butter and cheese manufacture, and in a year about 1 million lb. of Swiss type cheese, 600,000 lb. of Holland type cheese, 350,000 lb. of whey cheese and 660,000 lb. of butter are produced.

Attached to the dairy is the Dairy School built in 1960, which is owned by the milk producers. Here, after a year's technical training at another dairy, come women students for a 15½-month course of theoretical, practical and laboratory instruction in dairying. The accommodation for the students is of a very high standard.

2. Tobias Naerland's Kaffiholen (poultry breeding station), Naerbö

At nearby Naerbö is the poultry breeding station of Tobias Naerland, which hatches under Government supervision about 250,000 chicks per year. Of these, about 150,000 are female, and these are despatched within hours of hatching to farms all over the province. The male chicks are killed, minced and fed to the laying hens. Eggs are fumigated with formalin vapour after being laid and are incubated under controlled conditions. Experimental breeding of chickens and geese is also carried out.

3. Ryttervik Soyaoljeraffineri (soya bean oil extraction and refining plant), Egersund

Processing soya beans, imported mainly from America, at the rate of 85 tons per day, this plant extracts the oil by means of hexane and produces soya flour, fatty acids and lecithin as by-products. Most of the oil is used in the manufacture of margarine and edible oils.

Alongside the oil refinery is a fishmeal plant, temporarily out of use because of the failure of the herring fisheries around this part of the Norwegian coast. The refinery is equipped to extract herring oil when conditions permit.

(Continued on page 481)

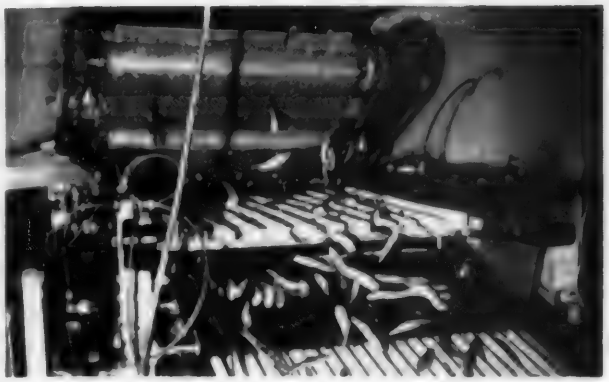
Interior of the dairy of Jaeren Meieri at Bryne. (*Left*): The whey cheese room; on the left is the whey evaporator, behind is a separator, and on the right a homogeniser. (*Right*): Milk curdling vats, with cheese moulds in front.

A laboratory in the dairy school of Jaeren Meieri.

Mr. A. P. Buchanan, Mrs. M. H. M. Arnold, Mrs. J. G. Davis, Mr. W. Gordon Carey, Mrs. A. N. Harrow, Mr. A. N. Harrow, Mrs. A. J. Amos and Mrs. L. A. Allen examine a tray of eggs about to be placed in an incubator at Tobias Naerland's poultry breeding station.

Dr. A. J. Amos rests on a bollard on the wharf of Ryttervik soya-oil refinery.

(*Left*): Mr. Phil, manager of Rogaland Fellessalg meat processing plant, talks about meat curing to Miss S. Wood, Mr. T. McLachlan, Mrs. McLachlan, Dr. J. G. Davis, Mr. H. B. Heath and Mr. R. D. Mason. (*Right*): Mr. Sven Carlsen, director of Produksjonslaget Samhold, explains a point about the wrapping of meat products in plastic film to Mr. T. McLachlan, while Miss R. Blood looks on.



Fish canning at Bjelland's factory in Stavanger. (*Left*): An ingenious machine which sorts brisling and presents them to the skewer all facing the same way. The fish are then decapitated automatically, hung on racks and smoked. (*Right*): Packing smoked brisling in aluminium cans.

Mr. Tor Anda (wearing hat), director of Rogaland Egglag, explains how eggs are sorted. On his right is Dr. A. J. Amos and nearest the camera is Mr. H. B. Heath.

Mr. M. H. M. Arnold surveys Stavanger harbour from the roof of Nordkronen mill.

Mr. K. H. Skramstad (*right*), bacteriologist in the Canning Research Lab., discusses a plate culture with Dr. L. A. Allen.

Soup (not sausage!) is being filled into casings at Rogaland Fellessalg.

(*Left*): Mr. T. McLachlan and Dr. J. G. Davis brave the slipstream on the hydrofoil boat en route to Bergen. (*Right*): A hydrofoil boat of this type took the party to Bergen, but broke down on the way back.

4. Nordkronen Samvirkeselskap (flour mill), Stavanger

With a silo capacity of 25,000 tons, this flour mill, the largest in Stavanger, processes about 40,000 tons/year of wheat flour and about 10,000 tons/year of rye flour. Most of the machinery is not of the latest pattern, but modernisation and expansion is in progress and among the newest installations is a Hesser bag packer which packs 64 1-kg. bags/min., the bags being produced automatically from a roll.

5. Rogaland Fellesalg (meat processing plant), Sandnes

A few miles to the south of Stavanger is the industrial town of Sandnes. Rogaland Fellesalg is a co-operative owning a number of plants; the one at Sandnes is highly mechanised with modern equipment, producing a range of smoked and canned meats, sausages, etc. Attached is a slaughterhouse, and by-products such as wool, hides and animal feed ingredients are packed and sold.

6. Rogaland Egglag (egg packing station), Sandnes

Here eggs are received, candled, graded and packed. There is also a mechanised poultry-processing line, the live birds being received, slaughtered, cleaned and vacuum packed in a production line which is one of Norway's first to be operated on "broiler" lines.

7. Chr. Bjelland and Co., A/S (fish canning factory), Stavanger

This is one of the largest and most modern fish canning factories in Norway, operated by a company with a large number of processing plants along the Norwegian coast. The products handled include herring, brisling, sardines, kippers, anchovies, shellfish and processed and preserved fish products, all handled by modern machinery. A high degree of mechanisation reduces handwork to a minimum, and sorting, filleting and hanging on racks for smoking are in many cases performed automatically. Aluminium cans are chiefly used, and there is a can-making shop.

8. Norwegian Canning Industry establishments, Stavanger

(*a*) *Research Laboratory*

This conducts research into all aspects—physical, chemical and microbiological—of canned products. An engineering section carries out design and development work on new processing machines.

(*b*) *Quality Control Institute*

This maintains contact with processing plants all over Norway, receiving samples which are checked for compliance with specification. Standards of quality are laid down.

(*c*) *Canning School*

In a 1½-year course students are taught the basic theory and practice required by foremen and technicians in the canning industry. Instruction in chemistry, microbiology, mechanics and other subjects is given, and students do practical work in a miniature factory where the main types of machines used in a modern cannery are installed.

These establishments are financed through a compulsory levy imposed on all the firms comprising the Norwegian Canning Industry.

9. Norwegian Fisheries Research Institute, Bergen

This is a Government laboratory for chemical, biological and technological research into fish and fish products of all kinds except canned goods, which are handled by the laboratory in Stavanger.

The party travelled to Bergen on the new hydrofoil boat *Sleipner* which is scheduled to traverse the 120 miles between Stavanger and Bergen in 3¾ hours instead of the steamer time of 10 hours. The vessel disgraced itself, however, on the return journey by breaking down, arriving back in Stavanger not at 19.45, as planned, but at 02.30 the following morning.

10. Produksjonslaget Samhold, Stavanger

This co-operatively owned enterprise has three factories in Stavanger, a meat, fish and vegetable processing plant, a margarine works and a bakery producing bread and flour confectionery. All three were visited.

The party also visited the pottery of Stavangerflint A/S in Stavanger, which is run on British lines, using imported British clay and having many workers trained in this country.

The week ended with a farewell reception in the K.N.A. Hotel, given by the members of the party for our Norwegian friends, and among the large number of guests were the British Vice-Consul, Mr. C. W. Peck, the Mayor of Stavanger, Ordförer Jan Johnsen, members of Stavanger's local government and commercial organisations, and directors and representatives of all the establishments visited during the week.

Space does not permit a detailed description of the factories visited, but it is hoped in a future issue to describe in greater detail some of the more interesting plants.

Manuscripts Required

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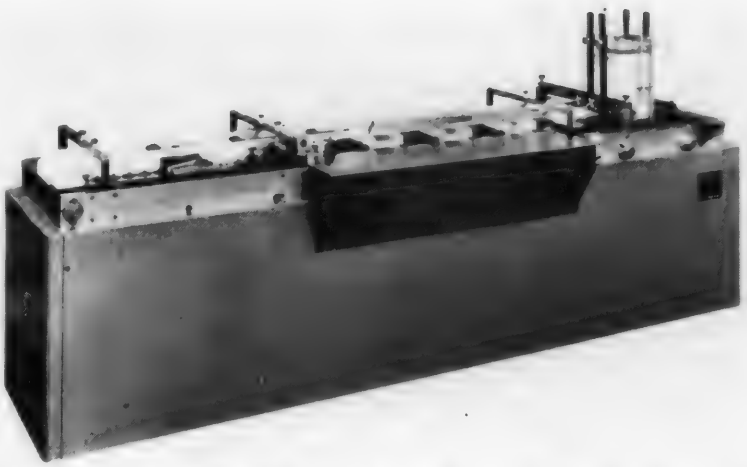


The " King-Tuk " machine, 10 ft. 4 in. long, 2 ft. 4 in. wide and 3 ft. 1 in. high (operating level). Cartons are stacked, side-seam glued, in the hopper on the right. They are automatically erected, conveyed at up to 90 a minute with fingertip speed control past the 4 ft. stainless steel loading table, and closed automatically. Variations of the machine operate with straight tuck or reverse tuck cartons, or with four-flap glue-end cartons.

New Horizontal Cartoning System

A major advance in cartoning is announced by the Paper Group of The Metal Box Company, recently appointed sole licensee in Britain for the *King-Tuk* cartoning system.

The *King-Tuk* machines are extremely compact and inexpensive, yet erect cartons ready for filling, convey them at a given rate past a manual filling station, and close them automatically. Thus a very large number of products, including foods, which had previously been cartoned by hand, can now be cartoned automatically.

The principal *King-Tuk* machine operates with the new *King-Tuk* edge-lock tamperproof carton. The carton is locked by the insertion of specially designed locking tongues into slits along the edge. This construction is very economical in board because the locking tongues are bitten out of the underflap. The cost of the carton is therefore about the same as the cost of a normal glue end carton. The design is fully covered by registration. When closed, cartons can only be opened by pulling the easy-opening tear strip. The contents are thus fully protected against handling and contamination. *King-Tuk* cartons are supplied side seam glued, and can be printed in multicolour.

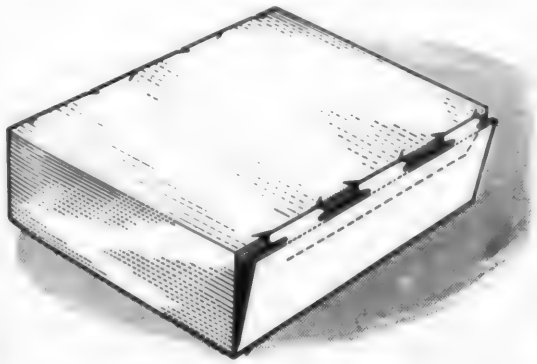
Variations of the *King-Tuk* machine operate with straight tuck or reverse tuck cartons, or with four-flap glue end cartons, within reasonable size limits.

King-Tuk machines are 10 ft. 4 in. long, 2 ft. 4 in. wide, and 3 ft. 1 in. high (operating level). They are fitted with heavy duty castors so that they may be easily moved about. Up to 90 cartons a minute is possible, and fingertip speed control is provided.

Crank operated controls adjust the machines in from 10 to 30 minutes to accommodate changed carton size whether one or all dimensions are affected.

Two operators are required to fill the cartons, one of whom can easily keep the hopper loaded with flat cartons A stainless steel table, 4 ft. long, is provided for loading.

If required, models can be made to tilt the cartons at about 30 degrees, for gravity-assisted feed.



A " King-Tuk " edge-lock carton showing the specially designed tongues and slits. A perforation is shown, and another also runs along the hinged edge of the flap. When closed, the carton can only be opened by pulling the easy-opening tear strip thus formed.

Liquid Nitrogen

(Concluded from page 468)

cents per lb. Consumption depends on insulation, number of stops at which the trailer doors are opened, and on temperature differential between atmosphere and cargo space. Furthermore, it is possible to reduce nitrogen consumption by installing movable inner doors to eliminate unnecessary refrigeration of empty cargo space. Fig. 1, based on information provided by Linde Company, shows how these factors affect liquid nitrogen consumption. Loss in transferring nitrogen from storage to truck tank is about 20%.

Typical daily operating costs are thus between $8 and $12 per day per truck for fleets of 5-50 trucks, and $17 per day for smaller fleets. However, several small operators can cut cost by combining their nitrogen refuelling operations.

A special attraction of refrigeration by liquid nitrogen is its independence of a power source. The system is therefore particularly useful in " piggy-back " transit methods. Of further importance is the rapid cool-down of the truck or trailer, an effect which cuts down the turn-around time and therefore the carrying capacity of the truck fleet. Finally, uniformity of temperature control and distribution can cut food spoilage well below the performance obtainable with many mechanical systems and permits simple and more complete loading of the cargo space.

Do Not Tell Secrets

By Lord Meston

A man may learn certain secrets in the course of his employment. When he leaves that employment is he entitled to divulge those secrets to other persons, who may be rivals to his former employers?

THE rule is that an employee is under an implied obligation not to disclose or make public any professional or trade secrets or confidential information which he learns by reason of his employment; and he will be restrained by injunction from publishing such secret or information.

A few cases on this rule may be generally interesting. In *Merryweather v. Moore* the plaintiffs were a firm of engine-makers. The defendant, upon completing a term of apprenticeship with the plaintiffs, was retained in their employment as a paid clerk. Later the defendant left the plaintiff's service for that of another firm of engine-makers. Two days before leaving the plaintiffs' service he compiled for his own purposes, and without their knowledge and consent, a table of dimensions of various types of engines made by them; and this table he had in his possession when he entered the service of his new employers, who subsequently exposed for sale an engine of dimensions corresponding to dimensions given in the table.

It was held that, in compiling and retaining the table for his own purposes, the defendant had committed an abuse of the confidence ordinarily existing between a clerk and his employer. Such confidence implies that a servant shall not use, except for the purposes of service, the opportunities which that service gives him of gaining information. Accordingly the plaintiffs were entitled to an injunction restraining the defendant from publishing or communicating the table or its contents to anyone.

Order books are confidential

Passing from engine-makers to people who deal in live game, we may refer to the case of *Robb v. Green*. The plaintiff was a dealer in live game and eggs. The chief part of his business consisted in procuring the eggs, and in the hatching, rearing and sale of game birds. He occupied two "game farms" in the country where he kept a large stock of upwards of 5,000 laying pheasants and where he sold about 150,000 pheasants eggs in a year. He also supplied live pheasants for shooting, as well as for stock purposes. His customers were numerous, and for the most part were country gentlemen and their keepers; and their names and addresses were collected together in his order book.

The plaintiff wished to engage a manager, and he had an interview with the defendant, when he explained the nature of the business of a game farm; and the plaintiff stated that of course he relied on the defendant not to impart any information about the business done by the farm, and to treat everything in connection with the farm in strict confidence. Terms of remuneration having been agreed, the defendant was duly engaged as manager.

About four years later it came to the knowledge of the plaintiff that the defendant was carrying on a similar business to his own at premises described as "The Game Farm, Henley." The defendant sent two circulars addressed respectively, one to a great number of the plaintiff's customers whose names and addresses were comprised in the order book, and the other to gamekeepers whose names and addresses were also in the order book. These names and addresses in the order book had been copied from that book into a list by the defendant whilst in the service of the plaintiff, clandestinely, and without his master's knowledge or authority, and for the purpose of using it to solicit his master's customers to give their custom to him. It was held that it was an implied term of the contract of service that the defendant would observe good faith towards his master during the existence of the confidential relation between them, and that the defendant's conduct was a breach of that contract in respect of which the plaintiff was entitled to damages and an injunction.

Secret processes may not be disclosed

It is in connection with secret processes that a very strict attitude is adopted. On the same principle as above stated, an ex-servant who has been confidentially employed in the manufacture of an article under a secret process is under an implied obligation to his late master not to use or disclose any knowledge or information as to that secret process acquired by him during his employment. This principle applies to information

acquired and retained in the servant's memory as well as to information committed in writing and existing in a tangible form.

In *Amber Size and Chemical Company, Ltd., v. Menzel,* the plaintiffs manufactured size, called amber size, by a secret process comprising a secret mixture which was added to rosin size at the proper critical moment. The materials, proportions and density of the mixture and the critical moment for adding it to the rosin were all important parts of the secret process. The defendant entered the plaintiffs' employ and was at once told that the process was secret. He was subsequently instructed how and when to add the secret mixture to the rosin size, but he was not told the details of the mixture, which was prepared by an employee in another room. During the course of his employment the defendant found out the materials of the mixture which he had to fetch from the mixing room, but he did not find out the proportions or density. He ascertained that the plaintiffs used a very special form of hydrometer. After six years the defendant left the plaintiffs' employment and entered the employ of a rival firm as size maker with the view of making size of the same quality as amber size. He obtained a hydrometer exactly similar to that of the plaintiffs', but found the results unsatisfactory, the fact being that the graduations of the plaintiffs' hydrometer were wrongly numbered in order to keep the real density secret. The defendant therefore did not know the exact density of the plaintiffs' mixture, but he knew the materials and that it was a strong solution.

The defendant represented to his new employers and others that he could make the plaintiffs' size, and on these representations the new employers for the first time embarked on the business of size making. A sample of the defendant's size, and a sample purchased from a customer of the plaintiffs', were analysed and found to contain the same ingredients, namely, water, free rosin, combined rosin, soda, etc., though in slightly different proportions. The Court granted the plaintiffs an injunction to restrain the defendant from using the whole or any part of the plaintiffs' secret method or process of manufacture of size the knowledge of which was acquired by him during his employment by the plaintiffs, and from disclosing to any other person, company or firm any information with respect thereto.

Knowledge openly acquired may be used elsewhere

A servant is, however, entitled after the termination of the service to make use of the knowledge honestly acquired by him in the course of his service, so long as it was not acquired surreptitiously, or entrusted to him expressly or impliedly in confidence.

An employee is not violating any contract or obligation by using his knowledge of the system, organisation and general methods of business of his former employers. This is something quite different from divulging secrets or confidential information which a man has learnt by reason of his employment.

One really has to look at all the circumstances to see whether an employee has been guilty of any breach of confidence. In the following case the fact that the defendants were directors of a company, and not in a subordinate position, makes no difference to the principle involved. Thus, in *Worsley and Co., Ltd., v. Cooper,* the defendants were in the employment of the plaintiff company, who were paper merchants, and later the defendants became directors of that company. One of the defendants for several years travelled for the company and prepared a sample book and price list of the papers which the company sold. In it the various types of papers bore names—in some cases those in general use in the trade, and in others names of a fancy description—the names of the mills from which the papers came being, as far as possible, kept secret.

Later, the defendants were bought out of the plaintiff company and resigned their directorships. They thereupon set up in business on their own account as paper merchants, and they issued a price list of precisely the same arrangement as that of the plaintiff company, save that in many cases the papers were given new fancy names. It was held that the confidential information which the defendants had acquired while in the employment of the plaintiff company, and the use they had made of it subsequently, were not a breach of any express contract. The information had been obtained openly and honestly, and was of such a nature that the defendants were bound to acquire it and they were largely responsible for it. The information was not in the nature of a trade secret, and the conduct of the defendants in the use they made of it was not an actionable wrong.

In the above case it was also held that where, for their own purposes, distributors of goods do not willingly disclose the names of the manufacturers of those goods, the fact that such names are kept secret does not make the knowledge of them a "trade secret" in the sense in which that term is used in cases dealing with the disclosure of trade secrets.

In conclusion let it be remembered that a discovery made by a servant in the course of his employment and in his employer's time is the property of the employer and not of the servant.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between " those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor.

PACKAGING

Wax laminations for packs

Wax laminated cellulose film and other packaging materials for *Sun Valley* salted peanuts made by J. P. and G. Hacking, Ltd., are being supplied by the Metal Box Co., Ltd. The material used for the salted peanut pack is a wax lamination of two webs of cellulose film, one web being reverse printed in three colours—black, red and white—by gravure process. This material is supplied in reels ready for forming, filling and heat sealing into pockets, measuring 5 in. by 1⅞ in

Bubbles seal to untreated surfaces

A patent has been applied for a new type of plastic bubble packaging—a bubble with heat-seal adhesive pre-treated to its flanges, by Gordon and Gotch, Ltd. The new bubbles can be stuck to cards which have not been previously coated with a heat-sealing adhesive and the makers claim the bond is stronger than a seal made between untreated flanges and a coated card. The bubble seals directly to the face of the card without the aid of cardboard tabs or traps to lock it in place and the flange adhesive is transparent, so printing underneath stays clearly visible. The extra tenacity of the treated bubble allows it to contain heavier contents.

A range of special heat-sealing equipment for applying the bubbles has also been developed by Gordon and Gotch, Ltd.

This four-colour gravure printed Quip pack of J. Bibby and Sons, Ltd., consists of DIOlam K.20, manufactured and printed by Transparent Paper, Ltd. This material is a laminate of reverse printed DIOphane MSAT and saran surface coated parchment. It has the three advantages of providing an excellent moisture-proof barrier unaffected by creasing, excellent mechanical strength and high gloss quality print.

The red, black and yellow dispensers and four-colour display cartons for Sun Valley roasted peanuts are printed by offset lithography by the Metal Box Co.

New transparent packaging development

The Metal Box Co. has acquired a licence to develop the *Plasti-Lok* locked corner transparent package in the U.K.

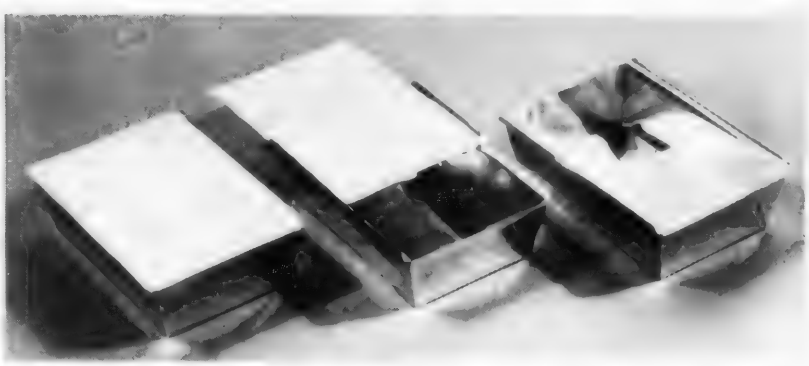
The *Plasti-Lok* packaging development relates to the manufacture of transparent corner locked trays produced from Polyflex transparent biaxially oriented styrene sheeting. During the course of manufacture, Polyflex is stretched in two directions, and this results in a non-brittle material of high rigidity, making it possible to use relatively thin gauges with adequate strength. Polyflex is of excellent clarity and sparkle and capable of being printed.

The *Plasti-Lok* tray has been evolved in the U.S.A. as the result of much research and development. The unique lock on the tray blank provides similar rigidity to a glued carton, and the lock cannot be withdrawn without destroying the tray.

Flat blanks are supplied to the customer for erection.

Existing methods for folding plastics in automatic machines usually involve the use of heat—this has added to the complexity of such machines. Machinery now in the course of development in the U.S.A. for forming *Plasti-Lok* blanks involves a special technique of cold folding, but it will be some time before this machinery is available in the U.K.

Plasti-Lok is expected to be used for preserved fruits and other articles requiring rigid transparent protection from dust and handling.



Cascelloid seamless aluminium foil pans are now available with lids, which have many advantages over present methods of sealing, being more robust in transport and, unlike millboard, cannot become soggy with gravies, fats or dressings.

Foil butter wraps

A significant development in the marketing of butter is the adoption of aluminium foil wraps by United Dairies for four of their blends, two English, one New Zealand and one Danish, to ensure delivery in factory-fresh condition. The wrap is a 0·009 mm. foil, supplied by Venesta Foils, Ltd., embossed and waxed, backed to a 40 g. vegetable parchment, with 5⅜ in. pitch with ⅜ in. punch hole perforations for registration. The butter wrapping machines are specially designed and made for United Dairies by Kustner of Geneva and are capable of wrapping 7 tons of butter in an eight-hour day.

The new United Dairies butter wrap, specially supplied by Venesta Foils, Ltd. It comprises a 0·009 mm. foil, embossed and wax-backed to a 40 g. vegetable parchment.

New bottle closure

Claimed to be an entirely new type of bottle closure, the Fords Crown is a standard-sized shell made of aluminium instead of steel and containing a flowed-in gasket sealing compound already extensively used in the food and beverage industry. The compound is positioned to produce the gas-tight closure instead of the more usual cork disc.

Among advantages claimed are a high salvage value, lower first cost, sterility, inertness and freedom from rusting, no dust problems and an attractive finish for printing. The closures can be handled in all standard bottle and assembly lines and can be lacquered or printed in various colours. They come in cartons of 50 gross weighing 20 lb.

This expanded polystyrene container, measuring 6¾ × 4¾ × 3 in., has been produced by Wall's to enable the consumer to keep their Family Brick in good condition for up to four hours. It retails at 1s. 6d. and can be re-used for shopping trips. It has a label on which the owner's name can be written for those who wish to leave the box in the shop to be collected later.

Porkburger packs

Porkburgers are a recent addition to a range of fresh frozen foods packed in cartons supplied by the paper group of the Metal Box Co., Ltd., manufactured by Bowyers. The Porkburger packs, which are made of white waxing duplex board in the reverse tuck in end style, measure 4½ in. by 1 in. by 5½ in. The full colour decoration is enhanced by hi-gloss waxing, which also provides additional protection for the contents. The surface design follows a layout and colour scheme similar to the two earlier packs.

Pear drink in cans

Complying with the needs of the younger generation, the Metal Box Company is now supplying Whiteways Cyder Co., Ltd., with a 16-ounce capacity can in which to display their *Peardrax*. Aimed at those who enjoy a sweet drink, the cans are attractively designed and made by the company's own process for canning soft drinks.

Metathene pouches

Drings frankfurters, vacuum packed in pouches made of Metathene, supplied by the plastics group of the Metal Box Co., Ltd., were offered together with a tube of Colemans mild mustard for 2s. 4½d., during a special promotion campaign, instead of the usual price of 3s. Metathene, polythene-coated cellulose film, is particularly suited to this type of product because of its strength, gas impermeability and moisture-proof and heat-sealing qualities.

Plastics milk bottle

The dairy industry is now offered a polypropylene, one pint milk bottle, that is light in weight, has a greater resistance to abrasion and unsightliness (as against the original polythene bottles, which looked unhygienic after a short time), has a far longer "journey-life" than glass, and has passed sterilising, filling and capping tests to an entirely satisfactory degree. Further details on application.

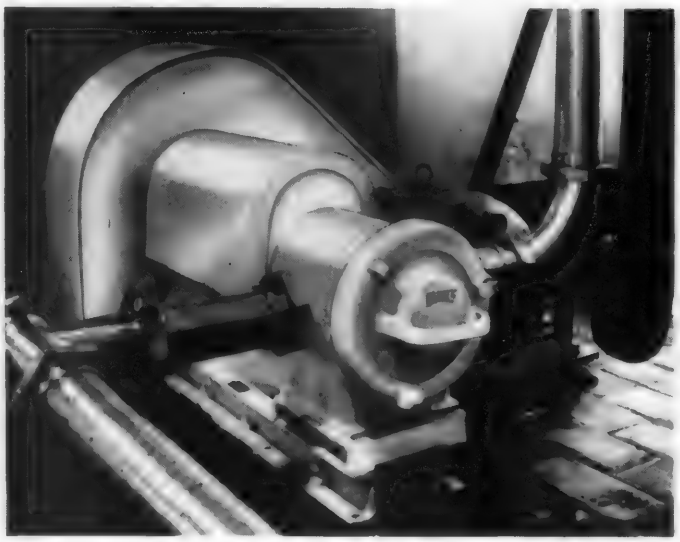
New range of plastic pots

The Metal Box Company have introduced two related families of polystyrene *Polypots*. Available in a variety of colours, there are eleven pots in the "squat" range, holding anything between 1½ to 12 fluid ounces, and ten in the "tall" range which will hold from 2 to 20 fluid ounces. Manufacturers wishing to market a new line or quantity can be sure their packs will resemble another product made by them. The versatile *Polypots* are suitable for holding spreads, creams, fruits, honey, jams and powders.

New canister design

Blue Cap Foods, Ltd., of Woolton, Liverpool, is now being supplied by the Open Top Group of The Metal Box Company, Ltd., with a standard canister for their Chili Beef with Beans. The pack is attractively decorated with a coloured picture of the dish on a vivid red background. The lithographed design was produced by the Metal Box studio at Carlisle.

MACHINERY and EQUIPMENT



(*Left*): **The size BC general type from the new range of Plenty "Easiclean" pumps installed at the Express Dairy Co.'s factory at Shrewsbury. It pumps 3,000 g.p.h. of curd and whey against 15 p.s.i. discharge head.** (*Right*): **This new two or three way leakproof plug-cock contains no bacteria traps and is suitable for in-place cleaning.**

VARIABLE FLOW PUMP

The main feature of the new range of *Easiclean* pumps is that in thirty seconds they are dismantled for sterilisation or washing, say the makers, Plenty and Son, Ltd. The shaft, coupled through a quick-release coupling to the drive, is withdrawn easily, leaving coupling, bearing and seal in position. The eccentric action is the principle employed in the new range. Four blades slide radially through the shaft and these blades drive a ported rotor. The eccentricity of the rotor to the shaft causes the positive suction and discharge action. By varying this eccentricity the flow of the pump is altered, so that it can be started in the neutral position when pumping very heavy materials, such as dough, in order not to overload the motor. An indicator calibrated in percentage of maximum output is standard equipment on *Easiclean* pumps, so that they are widely used for metering and blending.—**FM. 14.**

ADHESIVE TAPE DISPENSERS

Two new machines have been designed for automatic tape dispensing. The labelling machine applies printed tape labels to cans at a rate of up to 20 per minute, revolutionising, it is claimed, previous methods of manual application. The can bander has been developed to overcome the problem of banding two or more cans together by increasing the speed of operation to twice that of currently marketed machines. Makers are the Minnesota Mining and Manufacturing Co., Ltd. —**FM. 11.**

LIQUID LEVEL ALARM SWITCH

A stainless steel liquid level alarm switch of interest to the food industry has been introduced. The carbon steel flange of the switch is clad with a stainless steel plate, presenting to the process an unbroken surface to which deposits will not adhere. Displacer, stop arms and flexible shafts are also of stainless steel. For further details quote **FM. 16.**

FLOATER-PLUG PLUG-COCK

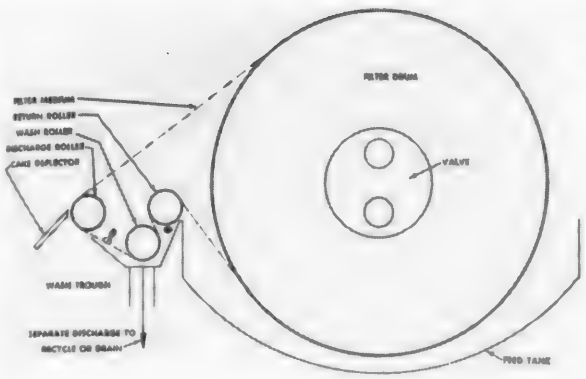
A new two- or three-way leakproof plug-cock for food and milk processing contains no bacteria traps, minimises galling, and is suitable for in-place cleaning, it is claimed. It consists of a tapered plug suspended in a stout barrel-shaped body between an upper and a lower cap and sealed with two compressible rings available in P.T.F.E., rubber or neoprene. The floating plug has less bearing surface on the taper and there is therefore reduced risk of "pick-up." The caps are fitted with wing lugs and if, for any reason, the plug should become tight in the body, it can easily be relieved by loosening the top cap and tightening the bottom cap. This operation lifts and frees the plug. In-place cleaning is easy because the plug is accessible from both top and bottom. For further details quote **FM. 13.**

POSITIVE AIR BLOWER UNIT

Manufacturers of pneumatic handling equipment have, for some time, been seeking a means of providing a supply of oil-free air at pressures above those normally supplied by the *Roots*-type blower. A tandem unit consisting of a 7 in. × 8 in. RBS blower and a 5 in. × 8 in. RBS blower mounted on a common baseplate and driven by a 65 h.p. motor has been developed by W. C. Holmes and Co., Ltd. The 7 in. × 8 in. machine, running at 1,280 r.p.m., delivers air at 15 p.s.i.g. via an intercooler into the second stage blower running at 1,260 r.p.m. This second stage blower delivers 440 s.c.f.m. at 20 p.s.i.g.—**FM. 22.**

PALLET LOADER

A semi-automatic pallet loader, claimed to be the smallest, simplest, quickest and most economical machine of its kind, has been designed to accept



This diagram shows the principle of operation of a new type of rotary vacuum filter.

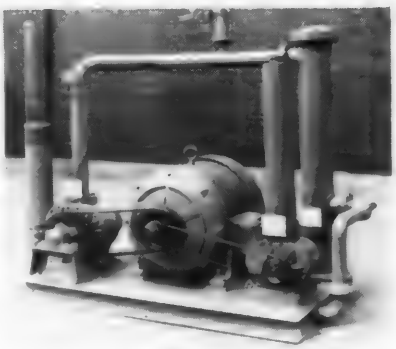
cartons or crates of almost any size, provided the different sizes are not mixed. The pressing of a push button by the operator initiates the sequence of depositing the layer of crates or cartons on to the pallet and the lowering of the pallet to receive the next load. This is repeated until the full unit load has been deposited on the pallet, whereupon the machine automatically discharges the full pallet and presents an empty pallet in position for the next load. For further details quote **FM. 12.**

ROTARY VACUUM FILTER

A new type of rotary vacuum filter is claimed to offer increased efficiency and lower operating costs. The outstanding development in this filter is the means for removing the filter belt from, and returning it to, the drum in the course of each revolution, which results in improved discharge of the filter cake. The use of a scraper blade or an air blow is dispensed with and the belt is washed before being returned to the drum. Thus a clean filter medium is always in use, giving sustained high filtration efficiency and drastically reducing downtime for cleaning the belt. For further details quote **FM. 10.**

IN-LINE REFRACTOMETER

Fluid process streams which previously could not be measured accurately because they were highly viscous, extremely dark, opaque or because the physical character changed when a sample was removed from the process can now be measured by an in-line refractometer. Streams of this type are encountered in the manufacture of jellies, citrus juices, ketchup, purees, etc. A light beam from an incandescent lamp is projected directly through a lens and out of the back of the explosion-proof housing to a prism which is in contact with the sample. In order to achieve high stability and sensitivity a null balance system is used. For further details quote **FM. 21.**



Holmes-Connersville positive air blower tandem unit consisting of a 7×8 in. machine and a 5×8 ni. machine, designed to supply 440 s.c.f.m. at 20 p.s.i.g.

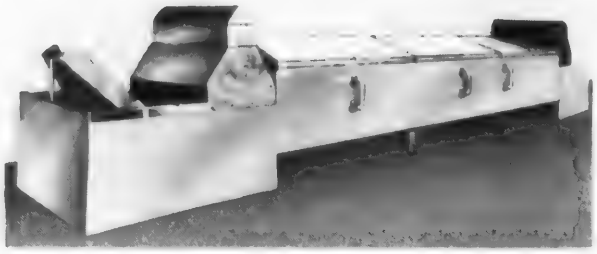
VACUUM PACKING MACHINE

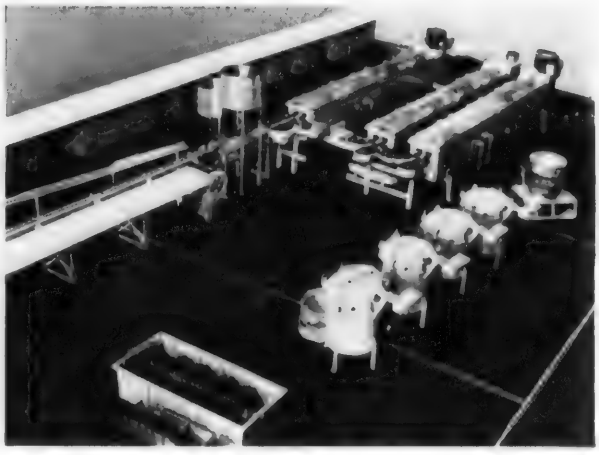
To meet current requirements in vacuum and gas packing, a Mark II version of the *Vac-Pac* vacuum packing machine has been produced, differing from the previous version mainly in the design of the head or chamber and the method of actuation of the sealing bars. Pneumatic cylinders are now used to operate the sealer bars, one cylinder being fitted to each end of each of the two bars. This makes control of seal pressure possible whilst at the same time providing for a very much higher maximum pressure than was available from the solenoid-operated Mark I version. The chamber has been redesigned to accommodate the new bar mechanism and to cut down wasted internal space. For further details quote **FM. 19.**

PLASTIC CONTAINER MATERIAL

Duramax is a new material from which all types of boxes, trays, bowls, etc., can be moulded. It is claimed to meet the most exacting demands for impact strength and toughness over a wide temperature range with significant loading. Containers made of this material are virtually indestructible under the roughest handling conditions and retain or recover their form when subjected to exceptional stress say the makers, W.C.B. Containers, Ltd. Other features are a smooth, non-toxic surface resistant to staining and abrasion and good chemical resistance at high and sub-zero temperatures.—**FM. 17.**

The strength of "Duramax," a new moulding material produced by W.C.B. Containers, Ltd., is graphically shown by this picture of containers made from this material.





(*Left*): **Braby scalder blancher for A.F.D.** (*Right*): **Braby No. 2 fruit and vegetable line (excluding seamer and boiler) with continuous diamond chain exhauster and cooker/cooler for acid products and retorts for non-acid foods.**

SMALL CANNING PLANTS

Frederick Braby and Co., Ltd., specialise in the design and supply of complete small and medium canning plants. Five standard fruit and vegetable plants have been designed and of particular interest to overseas governments and development corporations are the No. 1 and No. 2 standard plants for fruits, vegetables and fish. These lines have capacities ranging from 5,000 to 11,200 cans per 8-hr. day. The standard lines include seamers and boilers and also generating plant if required. These can be built up with the addition of certain specialised machines to meet most requirements, and special lines can be designed for particular applications.

The standard lines are based on the requirement that plants must be capable of handling a variety of products to make possible year-round production on different seasonal foods. **FM. 24.**

INSTRUMENTATION FOR CONTINUOUS SUGAR DIFFUSER

The largest continuous sugar diffuser drum in the world, 6.75 metres internal diameter, processing over 4,000 tons of sugar beet daily, has been equipped with instrumentation to provide fully automatic working.

Measuring 120 ft. in length, the diffuser is at the Ely works of the British Sugar Corporation. Honeywell Controls, Ltd., have supplied the main instrumentation, which consists of miniature and full-size indicating and recording controllers on a semi-graphic panel.

Diffusion water flow control is continuously linked to the controlled weight of beet slices entering. There is an overriding control of slice weight and diffuser speed from a controller linked to circulation tank level. Other quantities controlled by Honeywell instruments are: pre-lime tank level, raw juice flow and temperature, circulation juice temperature, diffusion water temperature and *p*H.

Four Cambridge recorders give permanent records of raw and circulation juice temperatures, and temperatures of the heat exchanger and diffusion water heater. To the right of the panel are auto/manual contactors and Record Electrical r.p.m. meters for cutting mill speeds. **FM. 27.**

BLANCHER FOR A.F.D.

The Braby Group has formed a new department known as Materials Handling Division, responsible for selling food processing equipment, mechanical handling plant and *Link Belt* vibrating screens made under licence.

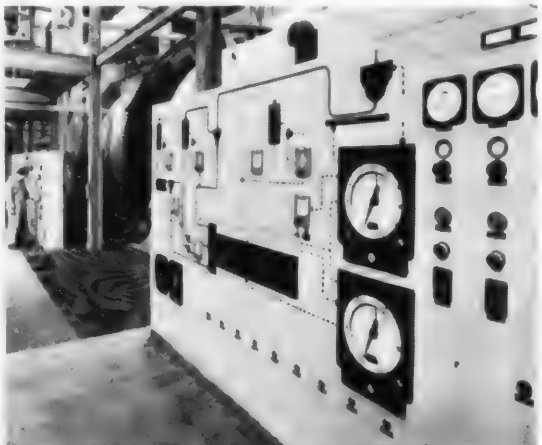
One of the new machines is the scalder/blancher illustrated, which has been designed for the steam scalding or blanching of vegetables before accelerated freeze-drying. It may also be applied in vegetable preparation lines before freezing, canning or conventional dehydration.

The A.F.D. process requires that high-quality vegetables be carefully prepared; steam scalding is required to inhibit enzyme action, so that colour, flavour and odour are stabilised. The steam blancher is more suitable than the water type for vegetables to be dehydrated, as steam removes less of the water soluble constituents. Sodium sulphite may be added during this process to improve storage qualities.

The machine has the following features: stainless steel mesh continuous wire belt, on which produce can be placed or carried in shallow trays; a tank for preventing condensate dropping on the product; a continuously variable drive to regulate blanching time between 2 and 6 minutes; built-in adjustable stainless steel spray nozzles for sulphiting together with stainless steel tanks and pump; automatic temperature controller; and special infeed and discharge sections together with aluminium condensing towers and insulated covers.

A standard model about 35 ft. long with a belt width of 4 ft. is available, having a nominal capacity of 2 tons of sliced vegetables per hour. A smaller version is available, approximately 18 ft. long and 2 ft. wide, suitable for use with pilot freeze drying cabinets or batch dehydration cabinets.

In addition to the scalder/blancher described, Braby also manufacture conventional rotary blanchers in three standard sizes. **FM. 23.**



Semi-graphic panel of automatic control equipment in front of the 120 ft. diffuser at the Ely Sugar Works of the British Sugar Corporation.

New ideas in

FLAVOUR CONTROL

A NEW SERVICE FOR FOOD MANUFACTURERS

Features of this service include:

1

Exact reproduction of any flavour from your own formulae under conditions of the strictest secrecy.

2

The development of new flavours with guaranteed exclusivity.

3

Standard flavours from a vast and subtle range of spice blends.

4

Spices and seasonings supplied on Salt, Dextrose or yeastless Rusk bases including, where required, ingredients such as Monosodium Glutamate, Milk Powder, Phosphates, and Sodium Metabisulphite.

5

Strict grading and control, within fine limits, of flavour, colour, stability and strength.

6

GUARANTEED DISPATCH WITHIN 48 HOURS

Our informative booklet 'Flavour Control for the Food Industry' will gladly be sent on request.

All these features are provided within your normal cost range:

they therefore will effect a considerable saving in time and cost on your own production lines.

Oleo-resins are extracted from spices under strictly hygienic conditions. Harmful bacteria and mould spores are eliminated, and the resultant concentrates actually combat bacterial activity.

Two basic forms of Spicemanns spices and seasonings are available, viz:

SPICEMAX

SALT, DEXTROSE OR YEASTLESS RUSK based, supplied in flavour-sealed bags.

SOLSEA

EMULSIFIED SPICES AND SEASONINGS in airtight drums.

Both types can be delivered IN NORMAL BATCHED QUANTITIES at NO EXTRA COST

SPICEMANNS LIMITED

MILLERS OF FINE SPICES FOR OVER EIGHTY YEARS

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MLB-S-1

NEWS DIGEST

Minister modifies Soft Drink Proposals

Proposals for new regulations which the Minister of Agriculture, Fisheries and Food intends to make jointly with the Minister of Health to replace the existing Food Standards (Soft Drinks) Order, 1953, have recently been issued. They include specific descriptions for the labelling of soft drinks made from citrus fruits or the juice of citrus fruits. They will revise the standards of composition for some of these drinks, increasing the minimum sugar requirements and reducing the maximum permitted quantity of saccharin. They also require that where soft drinks contain saccharin this must be declared on the label, and specify the acids permitted for use in soft drinks. The proposed regulations will apply to all sales, including sales in bottles or containers by caterers, but not to sales in glasses, cups, etc.

The proposed new regulations do not give effect to all the recommendations of the Food Standards Committee; for example, the recommendation that the use of saccharin in soft drinks should be prohibited has not been adopted. The recommendation that nutritional claims based on the carbohydrate content of some drinks should be prohibited has not been given effect in these proposals, but the Food Standards Committee is being asked to consider the whole question of energy claims as part of their current review of the Labelling of Food Order.

The proposals arise from a report published by the Food Standards Committee in 1950 on the need for continued control of the compositon, description, labelling and advertising of soft drinks. Copies of the proposals can be obtained from Food Standards Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1 (Telephone: Victoria 8511, Ext. 6295). If interested parties have any views which they would like considered before the regulations are made, they should forward them to Food Standards Division to arrive not later than December 8, 1961.

Campbell's Soups to market frozen foods.

Campbell's Soups, Ltd., are to introduce a new line of frozen prepared foods in England. It will include, at the outset, frozen prepared dinners, meat pies and dessert pies. They will be sold under the Swanson label.

Manuels Frosted Foods, Ltd., have been appointed sole distributors of Swanson products for the U.K. and also will distribute a line of Campbell's frozen soups.

The Swanson line is well known in the U.S.A. where Swanson pioneered mass-distribution of the frozen prepared dinner in 1952. Since then the sale of frozen dinners in the U.S.A. has reached the level of hundreds of millions dinners annually.

The Swanson line will include three dinners—Chicken, Ham and Macaroni and Cheese. The meat pies to be included are Beef and Turkey, dessert pies will include Cherry, Peach and Coconut Custard. Campbell's frozen soups will include Green Pea with Ham, Cream of Shrimp, and Oyster Stew. These products will be supplied initially from Campbell plants in North America.

Record pea season, say Birds Eye

In spite of unfavourable weather conditions, Birds Eye Foods, Ltd., say they have just completed one of the most successful pea seasons of the past ten years. Both for quality and quantity this has been an exceptional season.

At the company's factories at Grimsby, Yarmouth, Lowestoft and Kirby, production of quick-frozen peas this year was even higher than last year's record. In six or seven exhausting weeks between late June and early August, all four factories worked 22 hours a day, seven days a week, to get the crop harvested and frozen in the shortest possible time.

This planned increase by the company, which claims two-thirds of the British frozen food market, and every year undertakes the biggest pea freezing operation in Europe, is linked with market forecasts indicating that industry turnover will reach at least £57,000,000 by the end of 1961. Turnover in 1960 reached £46,000,000

The acreage sown this year was a third higher than in 1960. Freezing and packing plant at the factories was increase and improved to handle this additional tonnage and cold storage capacity at one factory has been trebled.

M.A.F.F. figures state that 1960 production of quick-frozen peas was 39,300 tons, compared with 28,369 tons in 1959 and 16,117 tons in 1956.

New technical publication on fruit juices

The Scientific and Technical Commission of the International Federation of the Producers of Fruit Juices held a two-day session at Wageningen in May, 1961, for the reading of papers on new techniques for production and scientific methods for the control of fruit juices. All the papers which were read on that occasion have been published in a permanent form by the International Federation. Five of the papers are in English, but all are provided with an English summary.

Copies of the book containing the full papers as read at the conference can be obtained from: the International Federation of Producers of Fruit Juices, 16, Rue de la Chaussée d'Antin, Paris, at a cost of 13.00 NF., including postage (approx. £1).

"Tempo" change of address

The Times Food Products Co., Ltd., which markets the *Tempo* range of frozen foods has moved to Berkeley Square House, 12, Berkeley Square, London, W.1 (tel.: Hyde Park 5226).

New broiler combine in Herefordshire

A new company, Sun Valley Poultry, Ltd., is to form the nucleus of a £1 million broiler chicken production and marketing group which will start operating soon. The group has a membership of 50 producers, and will operate a packing station in Hereford claimed to be the most modern in the country and which will have an initial single-shift capacity of 60,000 birds per week (processing them at the rate of 1,200 per hour) with provision for doubling this to meet demand. Chairman of the new company is Lt.-Col. Uvedale Corbett, D.S.O., this year's chairman of the British Turkey Federation.

Campbell's award Cambridge research grant

Campbell's Soups, Ltd., have established a post-graduate research Studentship in the Faculty of Agriculture in the University of Cambridge.

It will begin with the Michaelmas term this year and will take the form of a three-year course in Plant Breeding aimed at a higher degree.

Seen at the Packaging Exhibition were five glass jars of vegetables that were on display at the Great Exhibition of 1851. They were lent by Fortnum and Mason, Ltd., to the Glass Manufacturers' Federation. After more than a century the vegetables still retain their colour and condition. Two of the jars are shown here (centre) *with two modern jars of vegetables alongside.*

News from Scotland

C.W.S. concentrate preserve production

The Scottish Co-operative Wholesale Society, Ltd., of Glasgow, are now concentrating all their jam and preserve production at their Shieldhall factory in Glasgow.

Poulmack to occupy new factory

Poulmack, Ltd., is a new Aberdeen food processing and canning company which will occupy the first factory in the new Lang Stracht site being developed by Aberdeen Town Council. James Gordon Mackie, Ltd., of Aberdeen, have completed arrangements to acquire the factory site for letting to Poulmack, Ltd., who will operate the plant. They will be concerned with the processing of chicken meat but will also produce a range of food products. The firm is expected to go into production by January, 1962.

Coates' new colour pack

Coates Brothers Inks, Ltd., have issued a new, up-to-date edition of their colour pack, showing over 100 standard colours (including some new ones) for letterpress and lithographic inks. Each colour is printed solid and with a screen, and separate references for letterpress, Neoset letterpress and offset litho inks are given. A new section shows the full Coates' range of tints. Technical data on lightfastness, alkali resistance, spirit varnish resistance and cellulose resistance appears with each colour.

The inks, and any technical information, are obtainable from Coates' head office and factory (Easton Street, Rosebery Avenue, W.C.1), or from branch factories in Manchester, Glasgow, Birmingham, Leeds, Newcastle, Liverpool and Dublin.

Butter increases sales appeal

Harry Peck and Co., Ltd., the old-established manufacturers of fish and meat pastes, announce the addition to their range of further varieties of pastes with "10% butter added." They say that some 18 months ago the most popular fish variety—salmon and shrimp—was introduced with 10% butter added, and the enhanced quality and greatly improved flavour resulted in such demands from the trade and the public which Peck's have now met by increasing the number of varieties with this distinction to eleven.

A.P.V.'s 100th plate evaporator

The APV Co. say that they received an order for the 100th plate evaporator on July 20. It was a repeat order from Valio A/B, Finland's largest dairy company, and was for a double-effect whey evaporator for their Aanekoski creamery.

Ice Cream Federation gets down to business

The first conference of the Ice Cream Federation was held at the National College of Food Technology, Weybridge, on Friday, September 22, and was attended by delegates from the major ice cream industries. The conference was held to help provide an opportunity for junior executives and trainees of member companies to have the benefit of expert opinion on various aspects of ice cream manufacture.

Speakers included Dr. John Lucey of the Ministry of Health, Mr. Laurence Evans, Chief Information Officer of RoSPA, Professor John Yudkin of London University, a leading authority on nutrition, and the principal of the college, Dr. J. D. Mounfield, who had previously addressed the I.C.F. in April.

Dr. J. D. Mounfield described the education of modern food technologists and appealed to members of the I.C.F. to provide practical training facilities for his students at their factories. The college staff later conducted delegates on a tour of the college.

Praise for the industry was coupled with a warning against complacency by Dr. John Lucey, who shared the session "Control of the Manufacture and Sale of Ice Cream" with the Midland Counties Dairy Senior Technical Manager, Mr. K. A. Hyde.

Professor John Yudkin talked about the food values of ice cream and was reassuring about the "guilt" role of ice cream in causing dental decay and in contributing to the much publicised increase of coronary thrombosis.

Crofts (Engineers) extend stockholding service

Crofts (Engineers), Ltd., have ex-extended their stockholding service to their London branch at 36/42, Tanner Street, Bermondsey, S.E.1 (tel.: Hop 7751/4).

Advances in frozen foods

At the recent Birds Eye Sales Conference, the marketing director, Mr. K. J. B. Webb, outlined some of the advances which have taken place recently in the field of frozen foods, saying that since January new products introduced by the company had been buttered kippers which can be cooked in a bag, milk chocolate eclairs produced in the Eastbourne factory which has the biggest unit for the large-scale production of this product in this country, and dairy cream sponges.

Mr. Parry said that the dinners for one had greatly exceeded expectations; two additions to the range, plaice and cod, had been successful, and before the end of the year the company will probably produce another three.

COAL— automatically the cheapest fuel for the Food Industry

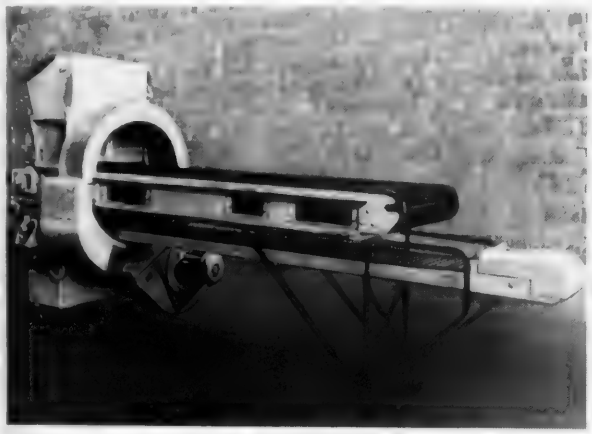
The growth of the 'affluent society' has revolutionised the eating and cooking habits of the modern housewife. Her shopping basket will contain a high proportion of manufactured and processed foods—which provide a variety of good and appetising meals regardless of season. But the very prosperity of this rich and growing market has created special problems for the firms competing for the housewife's custom: she wants the best value at lowest cost, and only the firms which can give her this will finally survive the intense competition for her custom. Economy—in every phase of processing—is obviously a practice essential to progressive success.

COAL—AND THE BOILERHOUSE

But the industry's economy drive quickly revealed one thing—that any programme of modernisation must start with the scrapping or adapting of obsolete systems in favour of *modern* installations. Coal—traditional fuel of British industry—is still the fuel which can match performance with economy when used in modern installations designed to burn coal with an even heat and minimum attention and maintenance.

COAL—AND MECHANICAL STOKING

Modern grading and washing methods ensure that coal is the most efficient and consistent fuel for every type of boiler—the ideal fuel for the Food Industry.



A chain grate stoker ready for installation in any type of boiler.

But to obtain the maximum heat at the lowest cost, coal should be mechanically stoked. A mechanical stoker fitted with special automatic controls automatically feeds the right amount of coal for the boiler load, even when the load is varying; it burns coal at optimum efficiency all the time without the emission of smoke (thus complying with regulations in Smoke Control Areas); and it virtually replaces the human element in boiler operation. There are many types of mechanical stokers—chain grate, coking, sprinkler and underfeed. Standard models are available for all sizes of boilers.

COAL—AND RELIABILITY

Coal deliveries today are completely reliable—on the dot, on the spot. Delivery and storage systems are being completely reorganised and streamlined by leading coal merchants; handling is being mechanised. You can be sure of getting a suitable grade of coal—when you want it, where you want it—for our coalfields contain enough coal to satisfy *all* the demands of British industry for centuries to come.

A lorry, fitted with a mechanical conveyor, feeds coal into a bunker.

HERE ARE SOME SPECIAL SERVICES

Technical advice

The N.C.B. Technical Service is highly organised to deal with any problems connected with coal and coal-burning installations. Whatever your problem you can call upon the Regional Office for advice and assistance.

A Free Film Service

As an additional service, a series of instructional films have been produced by the N.C.B. film unit, which show how outdated hand fired boilers can be converted to mechanical firing and give examples of the financial savings. *There is no charge for this film service.*

Heat Investment Plan for Commerce and Industry

No deposit, repayments spread over five years, low interest charges that can be set against tax, full investment and other capital allowances that can be claimed at once—these are the terms available to the manufacturer or businessman who wants to install modern coal-burning equipment without touching his capital resources.

For these services contact your Regional Sales Office of the National Coal Board.

COAL—AND THE FUTURE

The National Coal Board is planning for the future all the time. It is constantly finding new ways to increase efficiency both above and below ground, with new equipment that is the best of its kind; its technical and scientific staff carry out tireless research into new methods of mining, new ideas in coal burning, new types of fuel made from coal and its chemical derivatives.

PROGRESSIVE INDUSTRY IS GOING FORWARD ON

COAL

ISSUED BY THE NATIONAL COAL BOARD

GOODYEAR

GLASS-FIBRE HANDLING BINS

WEIGH 1/3 AS MUCH...

COST 1/2 AS MUCH...

HOLD JUST AS MUCH

AS APPROVED METAL CONTAINERS

A new way to save money

Goodyear glass-fibre handling bins are press-moulded. They're tougher and stronger than other types of plastic bin—can be double stacked in use or nested when empty to save space. Half the price of metal containers and one-third the weight, they can't rust or corrode, are easier to clean and are available with lids, dumping attachments and other accessories.

GOODYEAR

Get the facts by writing to:

GOODYEAR SPECIAL PRODUCTS DIVISION, WOLVERHAMPTON · Tel: Wolverhampton 22321

A.F.D. to the fore at Commonwealth defence conference

At the Royal Military College of Science, Shrivenham, delegates to the Commonwealth Advisory Committee on Defence Science were given the latest details on accelerated freeze drying. The M.A.F.F. invited manufacturers to attend and exhibit at this important conference. The exhibitors included The Irish Sugar Company and Batchelors who were showing foods processed on the Vickers plant, and Armours and J. Lyons who were showing foods processed on the Aerated Foods/Atlas Plant. F.M.S., Ltd., demonstrated a wide range of their fried vegetables and Leybold Elliot and Mitchell Engineering showed models of their freeze drier.

Aerated Foods, Ltd., gave details of their latest development which is an Atlas single unit capable of processing 2½ tons per day. A group of five such units, which will cost approximately £175,000, will be capable of processing nearly 4,000 tons per year. Aerated Foods were also showing their A.F.D. instant tea, claimed to be the first A.F.D. product to be retailed in this country. This was shown in three forms—as a pure tea crystal, as a tea crystal pre-mixed with powdered milk and in individual tea/milk tablet form.

Chemical cleansing agents approved

BHC 318, a product of the British Hydrological Corporation, is among the chemical agents approved for the cleansing of milk tankers, vessels or appliances as an alternative to scalding with boiling water or steam in accordance with Regulation 27(6)(a) of the Milk and Dairies (General) Regulation, 1959. The approval is announced in Circular FSH 6, dated June 30, 1961, from the M.A.F.F.

Hygiene code for poultry dressing

The Minister of Health and the Minister of Agriculture, Fisheries and Food have issued jointly the fifth in the series of Food Hygiene Codes of Practice.* This code is about the hygienic handling of poultry when it is being dressed and packed for sale: earlier codes dealt with the hygienic handing of meat and fish in the course of transport and in the retail trade.

* Obtainable from H.M.S.O., London, price 1s. 3d. each.

New H.Q. for D.S.I.R.

The new headquarters of D.S.I.R. at State House, High Holborn, London, W.C.1 (tel.: Chancery 1262), a new 15-storey block, was opened at the beginning of September.

Frood to market q.f. fish

A new departure for the Frood Division of J. Lyons & Co. is a new line they have recently introduced, quick frozen fish fillets. Three varieties in 8- and 14-oz. packs are being introduced—haddock, cod and small plaice fillets.

A.P.V.—telephone number change

The telephone number of the A.P.V. Co., Ltd., and A.P.V.-Paramount, Ltd., has been changed to Crawley 27777.

Leonard Hill manager wins publishing prize

Mr. David Kingham, of Leonard Hill, Ltd., is one of the two winners of an award from the Young Publishers Association. The award is a trip to the United States to visit printers, publishers, binders, wholesalers and packers to gain an insight into the American publishing and printing trade.

The two young publishers leave on November 25 for their three-week visit. Mr. Kingham is manager of circulations and book sales at Leonard Hill, Ltd., and has been book department manager for three years. He was one of the two members of the Association who made the best impression on a judging panel, with a written review of their publishing career and an interview.

Mayor opens new Birds Eye cold store

The new Birds Eye cold store at Great Yarmouth, which will store more than 10,000 tons of quick frozen food, was opened by the Mayor of Yarmouth, Alderman E. Barker. A special train from London brought about 70 guests for the ceremony, which was preceded by lunch in Yarmouth Town Hall, after which the guests visited the store, where the mayor unveiled a plaque fixed to the wall, to commemorate the opening. A tour of the cold store followed.

Other guests visited Lowestoft, where they saw new di-electric thawing apparatus, which thaws out whole blocks of fish in a short time.

Birds Eye developing to meet poultry demand

Originally founded in Great Yarmouth, Birds Eye Foods, Ltd., is still extensively developing. At least £1,250,000 will be invested in new building projects both there and at Lowestoft.

Fish fingers, second most important product in the Birds Eye range, were initially produced in Great Yarmouth, but the buildings were later converted to handle the whole of the company's poultry production. Ten chicken rearing houses were introduced in 1958, a further ten in 1959 and another ten this year, bringing the yearly production of chickens to well over 4,000,000.

Paper pulp from bagasse

An agreement for the supply of pulp mills for the paper industry has been contracted between Simon Handling Engineers, Ltd., and International Pulp Products, Inc., who hold the patents for a process which allows the production of pulp from bagasse with higher yields, lower chemical cost, better quality and a wider field of applicability, known as the *Cusi* process.

U.S. Soybean Council opens London office

The Soybean Council of America, a non-profit making organisation representing growers and processors in the U.S.A., has opened an office in London which will provide advice and information on the latest scientific data and techniques of the uses of the soyabean. Advice is available from experts from the U.S.A., U.K., the Commonwealth and Europe. Close co-operation will be maintained with trade associations in the U.K.

Properly processed soyabean oil meal is now universally accepted as the most important single source of protein for use in livestock and poultry feeds, and also plays an important part in human nutrition by providing additional protein in many products.

Forthcoming Meetings

S.C.I. Food Group, 14, Belgrave Square, London, S.W.1; Wednesday, November 8, 18.15: "Crystallisation of Sucrose," by Dr. H. E. C. Powers; Wednesday, November 22, 18.15: "Food Technology in Norway," the film and members' impressions of the 1961 tour.

Thursday, November 16, 18.30, joint meeting with Birmingham Section, College of Technology, Costa Green, Birmingham: "Technology in Pakistan," by Dr. J. W. Corran, F.R.I.C.

British Insecticide and Fungicide Conference, organised by the Association of British Manufacturers of Agricultural Chemicals, Cecil Chambers, 86, Strand, London, W.C.2: Grand Hotel, Brighton, November 6-9.

Third Health Conference for Executives, organised by the Chest and Heart Association, Tavistock House North, Tavistock Square, London, W.C.1.: Connaught Rooms, London, W.C.2, November 30, 10.00-16.30.

Mr. R. C. W. Banks

Mr. D. C. Gordon

Mr. T. Heywood

Mr. P. G. Murphy

Mr. M. Ormerod

PEOPLE

Mr. R. C. W. Banks has been appointed managing director of British Fish Canners, Ltd., while Mr. D. C. Gordon is now director of sales and Mr. N. O. F. Jenson is director of production for the same company.

*

Mr. Patrick G. Murphy has been appointed milk marketing supervisor of Venesta Foils, Ltd.

*

Mr. A. D. Bonham-Carter, U.K. co-ordinating director of Unilever, has been appointed chairman of the finance committee of the British Standards Institution.

*

Professor W. T. Williams, D.Sc., A.R.C.S., F.L.S., has been appointed a member of the Agricultural Research Council in place of Professor S. J. Watson, C.B.E., D.Sc., F.R.I.C., F.R.S.E., who has retired. Professor Watson holds the chair of botany in the University of Southampton.

*

After 50 years of service with the company, Mr. J. W. Brown, general manager of Armour and Company, Ltd., has retired.

*

Mr. J. T. Lewis has been appointed a director of Staveley Industries, Ltd., while retaining the positions of chairman of H.P. Sauce, Ltd., and deputy chairman of Wellington Tube Holdings, Ltd. On his appointment to the parent company board, Mr. Lewis gives up directorships of two Staveley Group companies, Bradley and Foster, Ltd., of Darlaston, and the Birmingham Chemical Company, Ltd., Lichfield.

*

Under the supervision of Mr. J. C. W. Stead, Batchelors Foods, Ltd., have sub-divided their Manufacturing Division, while Mr. K. S. Saunders of Unilever's Technical Division has been appointed a director and head of production engineering and development.

Mr. T. Heywood has been appointed marketing director of N. Kilvert and Sons, Ltd. Until recently he was marketing manager of Parkinsons Biscuits, Ltd.

*

Mr. Howard F. Smallwood, member of the Transport and General Workers' Union and former Cadbury Brothers employee for 50 years, has won the highest award in the Trade Union Movement, the T.U.C. gold medal. The medal was awarded by the President of the T.U.C., Mr. Ted Hill, for Mr. Smallwood's long and active service to the unions.

*

Mr. D. H. Lester, formerly a sales manager with Smedley's, Ltd., has been appointed sales manager of Polpak Distributors, a subsidiary of the Buxted Chicken Co., Ltd.

*

Mr. Peter Seary, B.Sc.(Hort.), M.Inst.Pkg., head of Research and Development of the Produce Prepackaging Development Association, has resigned and has been appointed head of section concerned with package design of Albert E. Reed and Co., Ltd.

Mr. Philip Shirley has resigned from the board of Batchelors Foods, Ltd., of which he was chairman, on taking up his appointment as a member of the British Transport Commission. Mr. Medwyn Ormerod has been appointed a director and chairman of the company with effect from October 1.

*

Mr. E. A. Osman has been appointed to the board of directors of P. Leiner and Sons, Ltd. Mr. Osman, who was formerly Senior Inspector of Taxes, Inland Revenue and Customs and Excise, joined the company as general manager in January, 1958.

*

Mr. N. D. Simons has been appointed product specialist of F. J. Stokes, Ltd. He has been appointed to deal with customers' technical problems.

*

Mr. D. E. A. Pettit has been appointed chairman of S.P.D., Ltd., the Unilever warehousing and distribution organisation, and simultaneously Mr. L. S. Pagan is to relinquish his directorship of the same company after 44 years' service.

Mr. T. D. Lively (right), *managing director of Armour and Co., Ltd., bids farewell to Mr. J. W.* ("*Tom*") *Brown, general manager of the company's Worcester factory, after fifty years' service with the company. A luncheon in Mr. Brown's honour was recently held in the Butchers' Hall, Smithfield.*

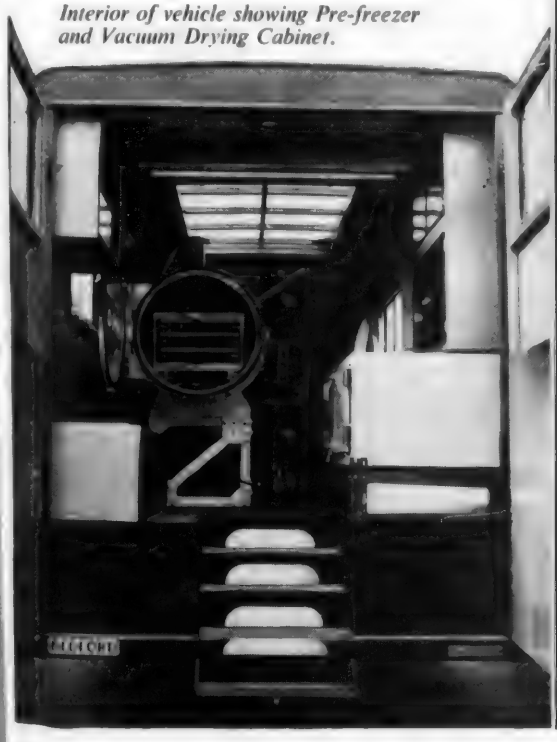
Mitchells Mobile Freeze-Drying Plant

Mitchell Engineering Ltd have designed and built a Mobile Freeze-Drying Plant for the demonstration and evaluation of this technique for food processors. This unit has been in continuous use at research stations and factories all over the country.

Mitchells have been actively engaged in developing Freeze-Drying techniques for ten years. In fact Mitchells built and installed the *first* commercial plant in this country.

Mitchells will be pleased to discuss the theoretical and practical applications of this process and can also arrange 'on-site' practical demonstrations of Freeze-Drying.

Interior of vehicle showing Pre-freezer and Vacuum Drying Cabinet.



A mobile Freeze-Drying research plant

MITCHELL

MITCHELL ENGINEERING LIMITED
100-104 THE BRIDGE, PETERBOROUGH, ENGLAND

SOLE AGENTS AND LICENCEES FOR
CHISHOLM-RYDER CO. INC.

OVERSEAS NEWS

ARGENTINA

U.S. investment proposal for citric acid plant

The Argentine Ministry of Economy has received an investment proposal from the U.S.A. of $10 million in machinery, equipment and cash for the installation of a plant producing citric acid, with an annual capacity of 8,000 tons.

Another U.S. investment proposal amounting to $152,940 in machinery and equipment for another plant manufacturing citric acid, with a capacity of 500 tons a year, has also been received.

AUSTRALIA

Kraft take over tuna canners

In Sydney, Australia, shareholders of Green's Products, Ltd., one of Australia's biggest tuna canning concerns, met and approved a takeover offer by Kraft Foods, Ltd., of the U.S.A. A spokesman for Green's said that Kraft would acquire fish canneries at Eden and Naroona on the New South Wales coast, two tuna vessels, and a fleet of trucks. Green's Products would continue to import canned herrings and sardines.

Kraft offered £A612,000 for the takeover.

Common Market: "Australia will suffer"

The annual report of the Australian Apple and Pear Board says that the industry must suffer if Britain joins the European Common Market, as its future depends largely on keeping existing markets in Britain and Europe. The report says that those markets take about 40% of Australia's production of apples and pears, and enabled near-record sales in the past season. The Board said that markets outside Britain and Europe offered little prospect of expansion except in a very long term.

BELGIUM

British firms at Liege fair

The few British firms which exhibited at the 6th Liege Commercial Fair from September 9 to 24 did excellent business. Food and beverage firms predominated in the British contingent; they were: Ambrosia, Ltd.; Borwick, Ltd.; Bovril, Ltd.; H. J. Gree and Co., Ltd.; Glenree Bonding Co., Ltd.; Holbrook, Ltd.; J. Lyons and Co., Ltd.; Northern Blending Co., Ltd.; and Tunnocks, Ltd.

BRAZIL

New milk plant

A new plant to process about 100,000 litres per day of milk into butter and spray-dried milk powder is planned at Garahuns in the state of Pernambuco. The main contract for the supply, erection and starting up of machinery to a value of about £150,000 has been given to A.P.V. do Brasil, the Brazilian associate of the A.P.V. Co. Another British firm is supplying the butter-packing equipment, and plant is also being bought from Denmark, Holland, Germany, and within Brazil itself.

GHANA

Increased fruit juice exports

Exports of fruit juice in 1960 from Ghana are reported from Accra by Barclays Bank D.C.O. to have been 16% higher than in 1959 and four times that of 1958.

The U.K. buys most of Ghana's fruit juice, and in the first five months of 1961 exports to Britain have risen to 192,000 gallons, compared with 35,000 in the same period of 1960.

INDIA

Sugar machinery production

There are at present seven units in India that manufacture complete sugar plants. In addition, there are fifteen other firms specialising in the manufacture of various equipment for sugar factories.

The value of sugar machinery produced is expected to go up to £12 million by 1965-66.

MAURITIUS

New milk powder plant

A new milk powder processing factory in Mauritius is reported by Barclays Bank D.C.O. to be nearing completion. It will reconstitute milk from powder, using in the process locally produced milk, which is of a low grade. The factory has been built and machinery installed under the ad-

The recently completed Liberty Flour Mills is the third large Philippine contract to be awarded to Thomas Robinson and Son, Ltd., since they designed and equipped the first flour mill in that country in 1958. The Liberty mill was started up earlier this year, and at the same time Robinsons received a fourth order from the Philippines for a mill of similar design, work on which is now well in hand.

vice and supervision of the New Zealand Dairy Products Marketing Commission, whose products they will use. The factory is capable of an output of 50,000 litres of milk per day and was expected to go into production in the first week of October.

NORWAY

Butter exports

Norway exported 2,978 tons of butter during the first seven months of this year, as compared with 5,171 tons in the corresponding period of 1960.

Butter exports to Britain dropped from 4,130 tons to 1,500 tons.

SOUTH AFRICA

Canned fruit exports to U.K.

South Africa was one of the largest suppliers of canned fruit to Britain during the first five months of this year.

Total imports by the U.K. during that period, amounting to 2,418,000 cwt., were some 5% higher than for the corresponding period last year, and, according to the latest available figures, South Africa supplied at least one-quarter of this amount.

New cheese

A new South African cheese, known as *Cedara*, has been developed after four years' research at the Cedara Agricultural College in Natal. It has a fat content of only 3% to 4% compared to the 30% to 40% of most cheeses, and the plan is to produce it on a large scale and at a reasonable price as a valuable food for lower-income groups. It ranges in flavour from mild to sharp and, unlike other low-fat cheeses, it is relatively soft.

Less fancy food being imported

According to our S.A. correspondent, Cape Town wholesalers are cutting imports of delicatessen foods and concentrating more on less exotic lines such as sardines, salmon, tapioca, sago, dates and cherries. Imports of products such as jams and sauces already produced in South Africa in adequate amounts are also being cut, as also of confectionery.

SUDAN

Credit from U.S.S.R.

Open credit is being granted by the U.S.S.R. for five years, payable in 12 years with 2½% interest, to finance a number of projects. Payment starts a year after the arrival of the necessary equipment for each scheme.

The projects include the building of two granaries and the establishment of four plants for canning foods.

WEST GERMANY

Success of ANUGA

The International Exhibition of Fine Foods and Provisions, ANUGA, held in Cologne from September 23 to October 1, displayed more emphasis on its market function than in previous years. About 255,000 visitors, including 9,200 from 69 countries, visited the exhibition, at which 2,154 firms from 45 countries were represented in 10 halls over an area of about 25 acres. The number of foreign visitors was almost 80% higher than at the last exhibition in 1959.

The U.K. belonged to the official countries taking part for the first time this year. In all, 58 firms were represented. Under the management of the Food Manufacturers' Federation the British firms showed a varied range of products; 37 separate firms exhibited direct or through their representatives. British participation in ANUGA had proved very successful. There was a comparatively heavy demand for citrus fruits, powdered coffee, chips, special wholemeal bread, fruit preserves, jams and jellies, soups, tinned game, spices, biscuits, deep-freeze foods, cocktail delicacies, cheese, good quality cream and other articles. Many large orders were booked not only from buyers from the Federal Republic but also from Australia, Trinidad, Iceland, Norway, Cyprus and the U.S.A. A few British firms have appointed representatives for the Federal Republic and other countries for the first time.

A particularly notable feature of the British exhibition was the establishment of international contacts. Last year Federal Germany imported 128.5 million DM worth of food products.

The Importance of Selling to America . . .

is emphasised in the November issue of **Conferences and Exhibitions.** Advice on the organisation of a press conference is given in the same issue.

Paint Manufacture discusses the recent advances in phthalocyanine pigments and takes a look at the applications of china clay in the paint industry.

A review of the U.K. refinery is featured in **Petroleum** and two examples are made of computers working in different fields of industry while trends in the use and design of digital computers are examined in **Automation Progress.**

Dairy Engineering looks at and comments on both cleaning in the farm and dairy and bulk collection equipment in this month's issue.

A review of raw materials for perfumery and cosmetics is made in **Manufacturing Chemist** together with the first part of an article on small scale equipment.

Dryers and process machinery are the theme of an article in the November issue of **World Crops** which will also incorporate features on grain drying and the pruning of coffee.

The assets of crossing the channel by tunnel or bridge, the handicaps of both, and possible solutions to arising problems, are illustrated in this month's issue of **Muckshifter and Bulk Handling.**

Chemical and Process Engineering examines the developments made in chemical production methods and has also a special feature on high pressure processes.

Specimen copies of these journals can be obtained by writing to the Circulation Manager, 9, Eden Street, London, N.W.1.

New Companies

V. A. Draper, Ltd. (697115.) Mnfrs. of and dlrs. in cheese, cream, etc. Dirs.: G. M. Murad, Marcel P. Delaporte, N. Ouwehand and A. M. Hendry.

Ellis and Merrick (Birmingham), Ltd. (697136.) 44, Cherry Street, Birmingham, 2. Confectionery mnfrs. and selling agents for foodstuffs and other goods, etc. Dirs.: F. J. Ellis and Hilda G Ellis.

Ford's (Croydon), Ltd. (697353.) 13, Commerce Way, Croydon, Surrey. Mnfrs. of and dlrs. in chocolates, etc. Dirs.: C. T. Ford, J. H. Ford, B. T. G. Ford, V. M. Ford.

Liga Food Products (U.K.), Ltd. (697760.) 42, Bedford Avenue, London, W.C.1. Mnfrs. of dietetic food products, etc. Dirs.: T. R. Neutelings, W. Neutelings, J. Bodde.

Dutch Pantry, Ltd. (698248.) 23, Dudley Street, Wednesbury, Staffs. Bakers, pastrycooks, etc. Dirs.: H. J. Touw, C. A. Touw, P. Touw.

Automatic Services (York), Ltd. (697792.) Century House, South Parade, Leeds, 1. Mnfrs. of and dlrs. in packaging and food processing machines, etc. Dirs.: L. Shepherd, M. M. Shepherd.

Ellesmere and Pitsmoor Dairies, Ltd. (698249.) 57, Dichingham Street, Sheffield, 4. Mnfrs. of ice cream. Dirs.: T. Procter, N. Procter.

Talbot and Co., Ltd. (698148.) 18, Austin Friars, London, E.C.2. Mnfrs. of and dlrs. in mineral waters, squashes, fruit juices, cordials, etc. Subs.: P. J. Bunyan, F. J. Wilson.

County and Country Foods, Ltd. (698693.) Dlrs. in and mnfrs. of pies, pastries and savouries, pastrycooks, bakers, etc. Subs.: R. L. Rickard and D. H. Barnes.

Corntex, Ltd. (699197.) 1, Crosshall Street, Liverpool, 1. Mnfrs. of and dlrs. in cattle and poultry food. Dirs.: J. Noonan, A. Davies.

A. and R. Compton, Ltd. (699381.) 222, Brigstock Road, Thornton Heath, Surrey. Growers, canners, bottlers, processors of and dlrs. in frozen and other foodstuffs. Dirs.: A. T. Compton, A. R. Compton.

Inexel, Ltd. (699714.) 61, Fairview Avenue, Gillingham, Kent. Mnfrs. of and dlrs. in foodstuffs and food products. Subs.: D. M. Graeme, P. G. Graeme.

Edmund Burke and Sons (U.K.), Ltd. (699663.) Raheen, Clonmel, Co. Tipperary, Eire. Bacon and ham curers. Dirs.: D. E. Burke, U. Burke.

Treat Products (Ashton-under-Lyme), Ltd. (699797.) 79a, Wellington Road South, Stockport. Mnfrs. of and dlrs. in ice cream and frozen foods. Dirs.: J. T. L. Mallard, P. M. Turner.

Sapsworths Frozen Foods, Ltd. (699959.) Bridge Close, Camp Road, Weymouth. Dirs.: M. G. Sapsworth, G. E. Dunford, B. P. Hogarth.

Farm Produce Packers, Ltd. (699975.) 120, Portland Street, Manchester, 1. Dirs.: G. J. Goodwin, E. Goodwin, B. Callaghan.

R. Tartaglia and Sons, Ltd. (699992.) Hyde Lane, Gloucester. Mnfrs. of ice cream. Dirs.: R. Tartaglia, A. M. Tartaglia.

East Anglian Breweries, Ltd. (700040.) Lenwade House, Great Witchingham, Norwich, Norfolk. Subs.: F. J. Morse, S. A. Morse, D. C. Steward, H. M. Peacock, M. V. B. Rivere, J. J. Goodliff, T. Spencer.

H. S. (Soft Freeze), Ltd. (700053.) 39, High Street, Crawley, Sussex. Mnfrs. of and dlrs. in ice cream. Dirs.: H. H Snowball, D. T. Harris, R. Howard, V. M. Snowball, P. J. Barraclough.

Robert Martin and Son, Ltd. (700170.) 9, Mansfield Street, London, W.1. Mnfrs. of and dlrs. in foodstuffs. Subs.: M. D. Masidlover, R. J. Sassoon.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

877,314. Kontrollhudar Andelsslakteriernas Forening U.P.A.: Method and means for cleaning intestines for sausage casings or the like.

877,533. F. H. F. G. Spierings: Method of making a citrus fruit consumable from the hand.

877,521. General Foods Corporation: Method of producing concentrated coffee extract.

877,691. James and Co. (Hungerford), Ltd.: Animal feedingstuffs.

877,784. Curtiss-Wright Corporation: Method and means for making a beverage concentrate.

877,727. Merck and Co., Inc.: Protein hydrolysates.

877,909. H. C. Oppel: Beet digging wheel.

877,746. H. C. Oppel: Hay-conditioning machine.

878,325. K. Ott (trading as Habra-Werk, W. F. Ott): Manufacture of containers or the like.

878,398. Lundell (Great Britain), Ltd.: Forage harvesters.

878,419. A. E. Billingham: Moulds for ice confections.

878,403. Hamac A.G.: High speed packing machines.

878,206. John Deere-Lanz A.G.: Apparatus for harvesting and conveying stalk-, leaf-, or stem-formed crops.

879,202. Rose Bros. (Gainsborough), Ltd.: Transfer mechanism.

879,203. Rose Bros. (Gainsborough), Ltd.: Application of labels or wrappers to bottles or like containers.

878,492. J. M. Reckie: Machine for grading root crops, onions or the like.

879,025. Rose Bros. (Gainsborough), Ltd.: Apparatus for opening or setting-up collapsed cartons.

878,875. Unilever, Ltd.: Treatment of sausage meat products, for example a string of sausages.

878,502. C. S. Schmerbeck: Process for cold bottling or canning of fruit juices and concentrates.

879,186. Alexander and Co., Ltd.: Carton manufacture.

878,747. Laboratoires A. Rolland: Method of preparing pure extract of liver.

879,135. Package Forming Machinery Co., Ltd.: Cartons.

879,086. G. C. Laabs: Process and press for heat-sealing cheese and the like.

878,584. G. H. Bushway: Corn-popping machine.

878,889. Wallis Tin Stamping Co., Ltd.: Vacuum capping machines.

879,221. Swift and Co., Ltd.: Packaging of edible products.

879,935. Fords (Finsbury), Ltd.: Machine for making caps for bottles and the like.

879,534. Reed Corrugated Cases, Ltd.: Boxes, cartons and like containers and blanks therefor.

879,426. B. Redmond and S. S. Redmond: Wrapping machines.

879,945. F. Fruengel: Method and device for electrically sterilising and cleaning milking machines or the like.

879,317. Vitagen Corporation: Methods for the manufacture of coffee concentrates.

879,520. P. R. Hyland: Bottle caps and like articles.

879,486. S. M. Alexandre and Co., Ltd.: Cartons.

879,440. Arenco A.B.: Packing machines.

879,363. D. W. Bingham: Can filling apparatus.

879,325. General Foods Corporation: Process for preparing a fruit-flavoured beverage.

879,330. C. E. Stewart: Closures for bottles and other containers.

879,634. Whirlpool Corporation: Ice-making machines.

879,408. General Foods Corporation: Baking powder composition.

879,501. Biscuit-en Chocoladfabriek Victoria N.V.: Method for the manufacture of a package or container, in particular for foodstuffs and luxuries, and a package manufactured by means of this method.

879,312. Smith Research and Development Co., Inc.: Electrical apparatus for catching fish.

879,828. Chocolate Cup Co., Ltd.: Manufacture of cups or other articles of shell-like form from molten chocolate.

880,762. Alofin Verwaltungs and Finanzierungs A.G.: Packing apparatus on a machine for producing blocks of plastic material.

880,876. Gordon Johnson Equipment Co.: Apparatus and method of freezing food products.

New patents are from the Journal of Patents. Permission to publish has been given by the Controller of Her Majesty's Stationery Office. The publication is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

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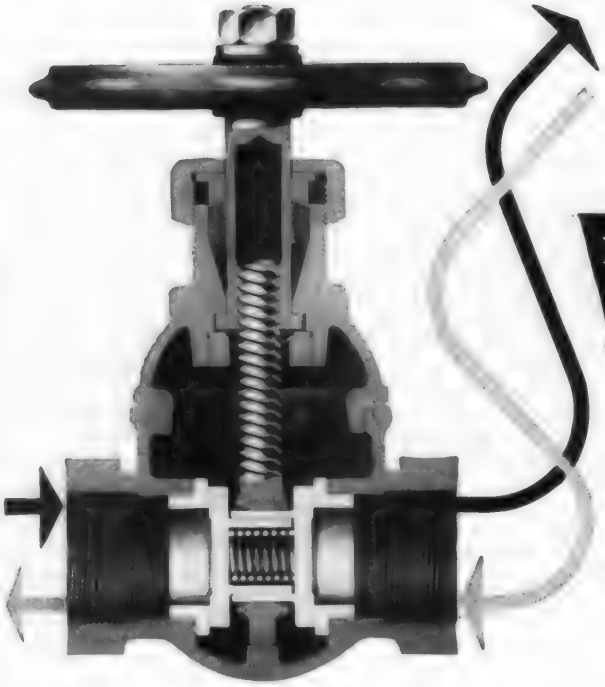

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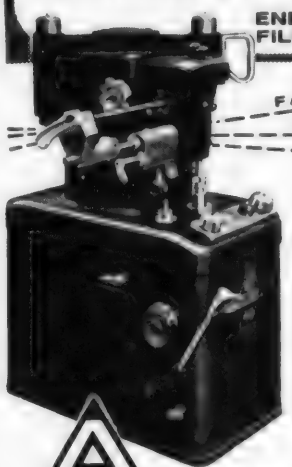

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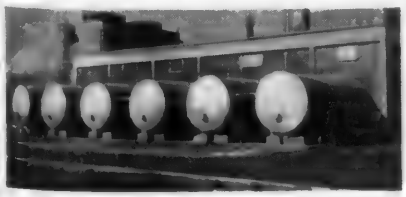
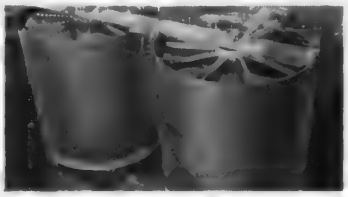
The clarification of waste liquors and trade effluents is essential to meet the requirements of river boards and other authorities. John Thompson-Kennicott Ltd. provide the successful solution to many of these problems, yielding an effluent which permits discharge into sewage systems or rivers.



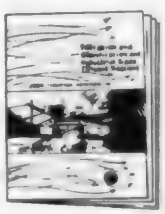
Pressure filters with main portions situated in the open, giving economy of building.



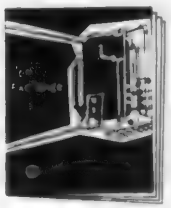
Coagulation and settlement tanks associated with a complete lime soda softening plant at a large steelworks.

LITERATURE AVAILABLE

De-Aeration Boiler and Feed Water Conditioning.



Filtration and Clarification and Industrial Trade Effluent Treatment



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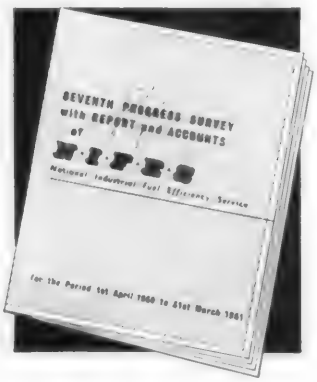
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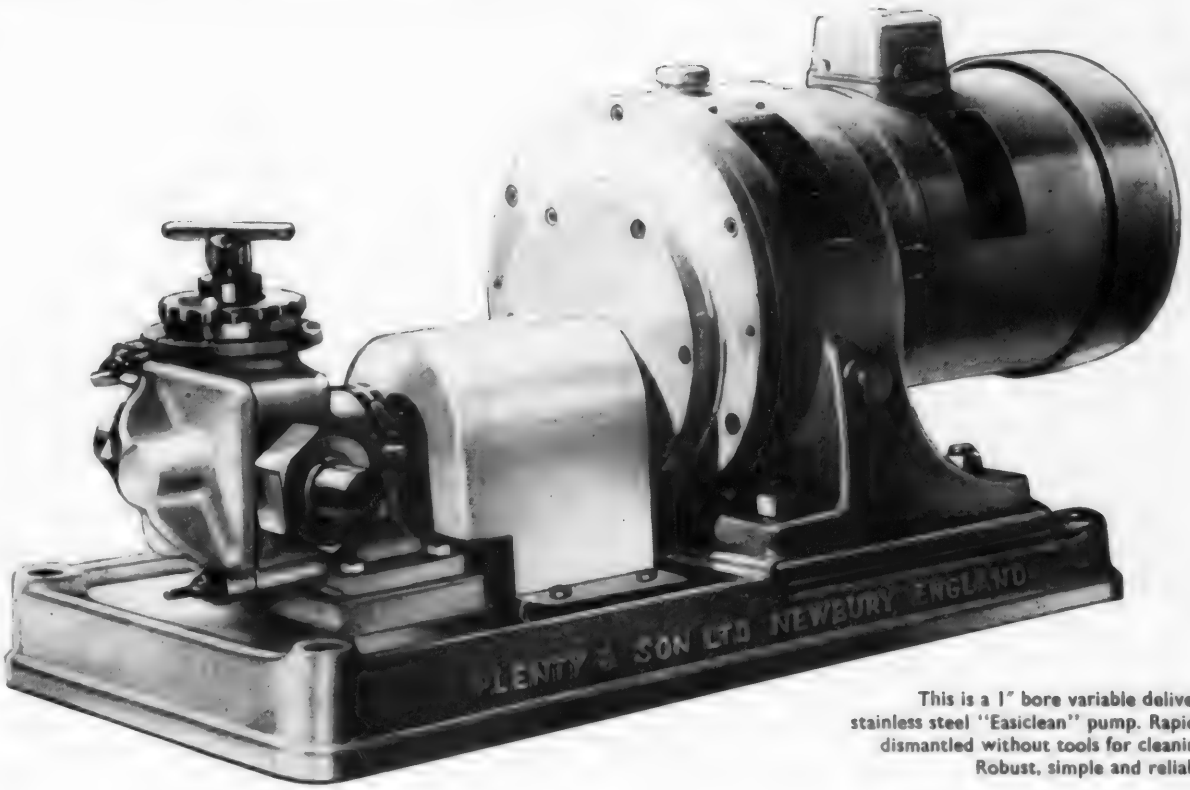

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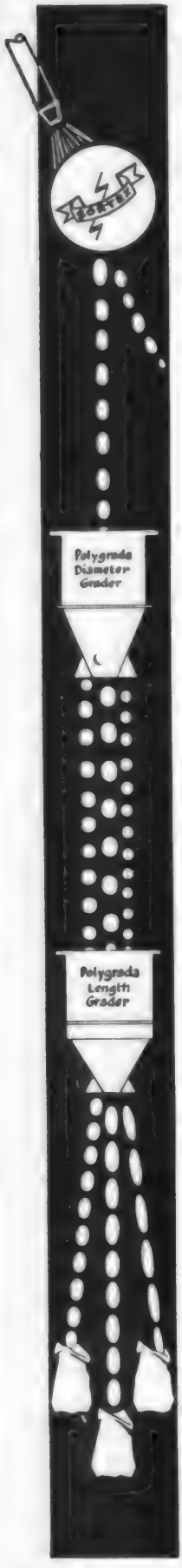

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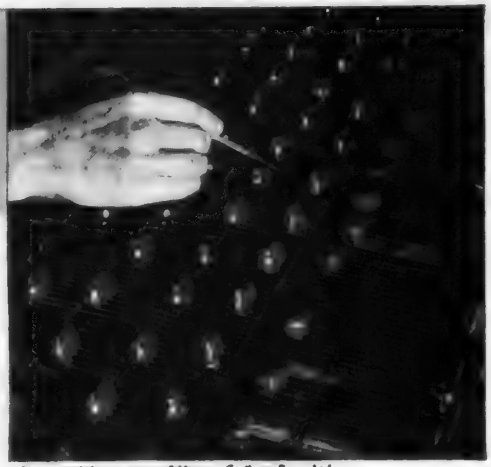

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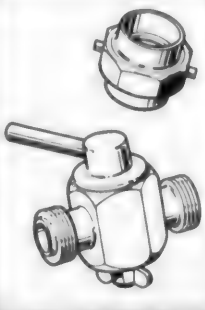

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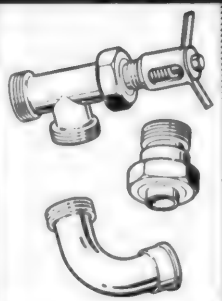

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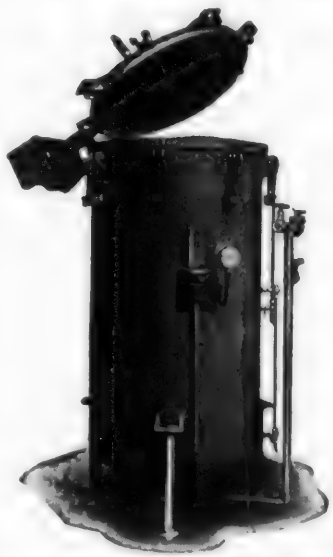

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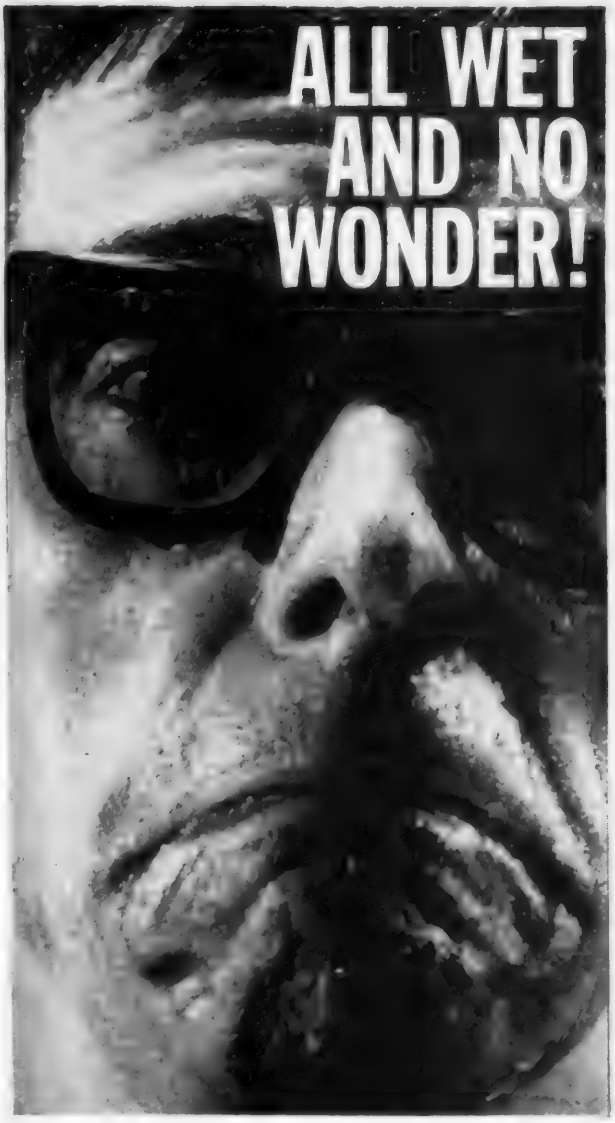

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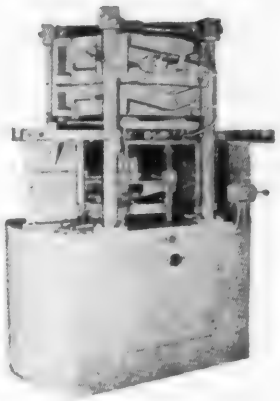

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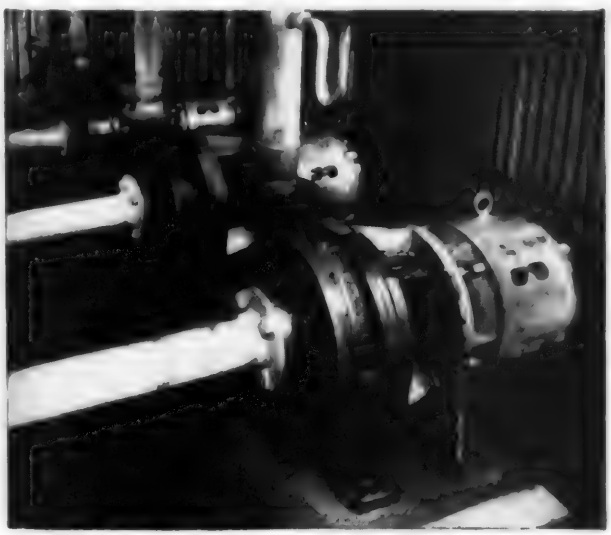

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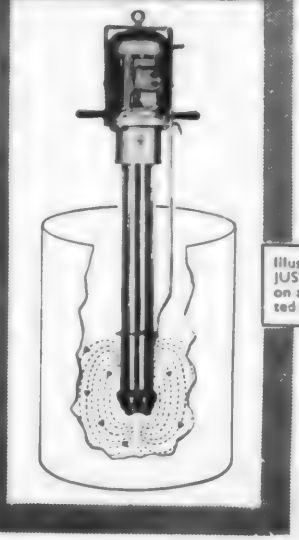

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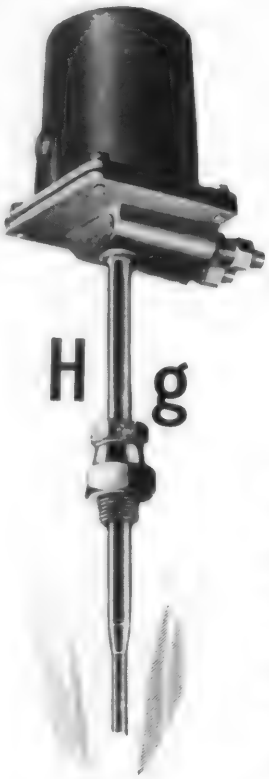

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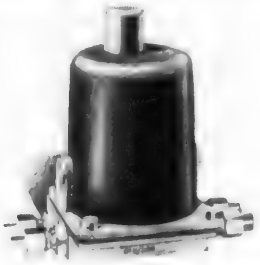

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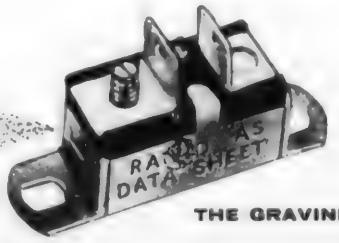

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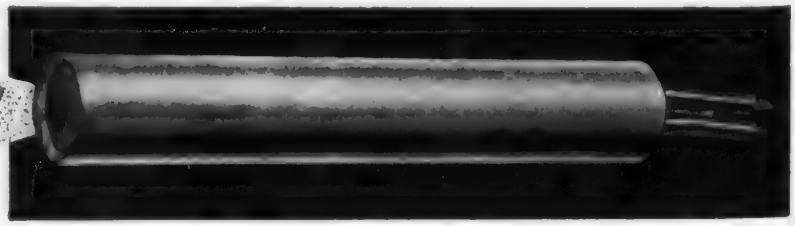

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Ref. B.645. British. Male. Married. Age 40. 3 yrs. Trainee Fitter, engrs. 4 yrs. Fitter/Assembler, sewing m/c mnfrs. 7 yrs. Spinning Foreman, thread mnfrs. At present Supervisor-assembly & packing—mnfr. elec. shavers. Exper. with both male & female labour. Seeks **SUPERVISORY POST (MNFRG.) U.K. pref. Scotland.** £700 p.a.

Ref. B.646. British. Male. Married. Age 29. B.Sc. (Chem.) 2 yrs. Analytical Chemist, atomic energy. At present Research Chemist, metal finishing. Seeks post as **RESEARCH OR ANALYTICAL CHEMIST.** U.K.—not London—S. England pref. £1,000 p.a.

Ref. B.647. British. Male. Married. Age 33. H.N.C. (Chem.), H.N.C. (Chem. Eng.). Studying for Grad. M.I. Chem. Eng. 2½ yrs. Electrician, control equipt. & electronic computer repair. 2 yrs. Shift Analyst, rayon mnfr. At present Chemist in Plant Devpt. Laboratory, mnfr. electrolytic plant. Has taken course in basic radar & electronic computers. Seeks **PROD. OR DEVPT. POST—PREF. AS ASST. ASST. PLANT/PLANT MANAGER OR EXPERIMENTAL TECH. SERVICE/TECH. REPRESENTATION WORK.** U.K.—Merseyside pref. £1,000 p.a. approx.

Ref. B.648. British. Male. Single. Age 24. B.Sc. (Elec. Eng.), Grad. I.E.E. 2 yrs. Grad. Apprentice, elec. instruments, electro-mech. devices. At present Technical Officer, R.A.F. Seeks post as **ELECTRO-MECH. ENGR.** London, S. England or Europe. £1,000 p.a.

Ref. B.649. British. Female. Single. Age 21. O.N.C. (Chem.). 3½ yrs. Student Chemist, mnfg. Chemists. At present Laboratory Asst. confectionery mnfrs. Exper. in devpt. pharmaceutical products & process control. Seeks post as **ASST. CHEMIST IN CHEM./PHARM./COSMETIC OR FOOD INDUSTRIES—DEVPT WORK PREF.** Central or E. London or Essex. £600 p.a. approx.

Ref. B.650. British. Male. Married. Age 30. G.C.E. 'A' level Physics, Chem. Botany & Zoology. Has passed 2nd M.B. Seeks post as **MEDICAL REPRESENTATIVE.** London.

Ref. B.651. British. Male. Married. Age 23. Awaiting result of D.P.I. exam. 3 yrs. laboratory Asst. plastic moulders. At present Plastics Technologist, insulation fabricators (elec.). Good exper. Compression & injection moulding/extrusion/glass fibre/resin products/dough moulding compounds/laminating materials & elec. insulation. Seeks **PLASTICS DEVPT. POST.** London. £800 p.a.

Ref. B.652. British. Male. Single. Age 38. Nat. Dip. in Agric. 2 yrs. Pupil, farmer. 7 yrs. Farm Manager. 3 yrs. Fieldsman/Sales, agric. engrs. & Contractors. 3 yrs. Manager, aerial crop-sprayers. At present Ground Mgr./Fieldsman Technologist, aerial cropsprayers. Seeks **POST CONNECTED WITH CROPSPRAYING / AGRIC. CHEMICALS.** £1,000 p.a.

Ref. B.653. British. Male. Married. Age 37. B.Sc., O.N.C. & H.N.C. (Mech. Eng.), A.M.I.Mech.E. 8 yrs. Apprentice/D/man., mnfr. coal mining m/cy, iron & steel founders. 2 yrs. D/man, cement mnfrs. 1 yr. D/man, ; 7 yrs. Senr. Tech. Asst., mnfr. aircraft engines & cars. At present Research Engr., mnfr. fuels & lubricants. Seeks post as **DEVPT. ENGR.** England or Wales. £1,300-£1,500 p.a.

Ref. B.654. British. Male. Married. Age 44. M.Sc., B.Pharm., M.I.Food Tech. 4 yrs. Apprentice, retail pharmaceuticals. 8 yrs. Research Asst., pharm. antibiotics mnfr. 4 yrs. Senr. Microbiologist (Research), sugar refining. 2 yrs. Head Food Sectn. Comm. Devpt., pharm. & food chemicals. At present Research Mgr., canned foods, etc. Studied advanced microscopy, calculus & statistics, read sevl. papers (mainly on antibiotics). Knowledge written French. Seeks post as **CHEMIST**—pharmaceuticals or food—S. England or Wales pref. £2,500 p.a. min.

Ref. B.655. British. Male. Married. Age 29. H.N.C. (Mech.), G.I.Mar.E. 7 yrs. Apprentice Fitter & Turner D/Man, engrs. 4 yrs. Marine Engr., ship owners. At present Design Engr., mnfrs. & designers superheaters. **SEEKS POST AS MECH. ENGR. (DESIGN PREF.).** London or S.E. England. £1,250-£1,350 p.a.

Ref. B.656. British. Male. Single. Age 30. 2 yrs. Sales Asst., mnfrs, glue, fertilisers, & mineral feed. 3 mths. Sales Asst., merchandising chemicals, oils, fats. 3 mnths. Farm Asst., pedigree cattle farm. 1½ yrs. Asst. Mgr., cattle & sheep ranchers. 5½ yrs. Forester, forest dept. Exper. control of labour, estimates, budgetting, reports, simple maint. plant & m/cy. Seeks pref. **AGRIC., FORESTRY OR PLANTATION POST** or post as **AGRIC. REP.** Abroad. £1,200-£1,500 p.a.

Ref. 657. British. Male. Married. Age 25. O.N.C., H.N.C. (& endorsements). G.I.Mech.E., G.I.Prod.E. 5 yrs. Mech. Apprenticeship. At present Prod. Methods Engr., light electro. mech. equipt. Seeks post as **PROD. ENGR.** Hayes/Slough/Reading areas. £1,000 p.a. approx.

Ref. B.658. British. Male. Married. Age 25. H.N.C. (Mech. Eng.). 3 yrs. Student Apprentice, engrs. At present Tech. Sales Engr., automotive, earth moving, agric. & marine antifriction bearings. Seeks post as **FIELD TECH. SALES ENGR.** Midlands. £950 p.a.

Ref. B.659. British. Male. Married. Age 46. 4 yrs. Jnr. Estimator/Site Supervisor, bldrs. & decorators. 4 yrs. Manager, civil engrs. 4 yrs. Works Supervisor, construcn. divn., petroleum Co. 3 yrs. Works Supervisor, construcn. div., pipeline engrs. 3½ yrs. Asst. Resident Engr., on marine installns., petrolm. Co. At present Agent, civil engrs. Exper. roads & bridges reconnaissance, location & construcn., oil refinery maint./construcn., pipelining, quarrying, explosives, concrete batching, asphalting, materials analysis & qual. control, stabilisation. Seeks post pref. as **AGENT** Middle or Far East. £2,000 p.a. approx.

Ref. B.660. British. Male. Married. Age 33. H.N.C. (Mech. Eng.). A.M.I.E.T. Dip. in Boiler inspection. & Maint. 5 yrs. Locomotive Apprentice, 2 yrs. Supervising Boiler Maker, railway. 4 yrs. Asst. to Planned Maint. Engr., chem. works. 2 yrs. Design D/man, superheater designers. At present Design Engr., superheater designers. Studying for A.M.I.Mech.E. Seeks post as **DESIGN OR MAINT. ENGR.** London (N.W. or W.) or Slough area. £1,150 p.a.

Ref. B.661. British. Male. Married. Age 33. A.M.I.E.D. 5 yrs. Apprentice, aircraft mnfrs. 1 yr. D/man, P.O. research. 1 yr. D/man. motor control (elect.). 3 yrs. Design D/man, process control equipt. 2 yrs. Design D/man & 1 yr. Asst. Chief D/man, nuclear instruments. At present Design Engr. (electro-mech.) & Project Engr., nuclear instruments. Seeks post as **DESIGN ENGR.** London, S. London, N. Kent. £1,500 p.a.

Ref. B.662. British. Male. Married. Age 48. A.Inst. Gas Engrs. 5 yrs. Apprentice, mnfrs. elect. instruments. 2 yrs. D/man, elect. & radio mnfrs. 2 yrs. Engr., electronic test gear. 2 yrs. Design Engr., aircraft mnfrs. 5 yrs. Tech. Officer, ministry. 2 yrs. Sales Mgr., electronic instruments. At present Mgr. and Director, electronic instruments, automation, process control gear mnfrs. Wide knwlge. prod. sales & mgt. a/cs. Author tech. book & many articles. Seeks **MANAGEMENT APPOINTMENT** or post as **SALES MGR. (TECH.).** Anywhere £2,000-£2,200 p.a.

Ref. B.663. British. Male. Married. Age 26. O.N.C. Has taken A.M.I.H. & V.E. exams. 3½ yrs. Asst. Design Engr., htg. & vent. contractor. 3 yrs. Asst. & Senr. Design Engr. h. & v. consultant. At present Senr. Design D/man, h. & v. consltg. engrs. Seeks post as **SENR. DESIGN D/MAN.** London. £1,250 p.a.

Ref. B.664. British. Male. Married. Age 45. 6 yrs. Prod. Engr. (tooling, design, etc.), mech. engrs. 4 yrs. Asst. to Director & Genl. Mgr., pressure diecasters. 4 yrs. Senr. Prod. Engr., domestic appliances. 2 yrs. Prod. Superintendent, pressure diecasters & engrs. 4½ yrs. Mgr. i/c factory, lamp making & wire dwg. 8 mths. Prod. Superintendent, domestic appliances. At present Genl. Prod. Mgr., electro/mech. engrs. Consid. exper. most aspects mngt., std. costing, works & prod. control, programming, prod. engg. for batch of flow processes, l/out, tooling, plant & equipt., estimating, W.S. Seeks post as **GENL WORKS OR PROD. MANAGER.** Essex, E. Anglia, Home Counties or London area. £1,550 p.a. approx.

Ref. B.665. British. Male. Single. Age 21. O.N.C. (Mech. Eng.). At present taking H.N.C. (Mech. Eng.). 1 yr. Trainee D/man, light engrs. 1 yr. Trainee Plastics Mouldmaker, mould makers. 2 yrs. Lab. Tech., & at present Research Asst., educ. institution. Seeks post as **TECH. SALES REPRESENTATIVE WITH PLASTICS COMPANY.** London or within 12-mile radius Surbiton. £650 p.a. approx.

Ref. B.666. British. Female. Single. Age 22. G.C.E. 'A' level Chem. 2½ yrs. Lab. Asst., food specialists. 1 yr. Lab. Asst., hospital. Seeks post as **LABORATORY ASST.** pref. Central London. £520 p.a. approx.

Ref. B.667. British. Male. Married. Age 40. B.Sc. (Physics, Chem.), M.Sc. (Org. Chem.). 1 yr. Research Chemist, paint mnfr. 6 yrs. Research Chemist, paint mnfrs. At present Research Chemist in edible oils, mnfr. soaps, detergents, cooking fats Exper. mostly alkyd resin research & organic pigment research, a pilot plant work on cooking & spray dried fats. Seeks **RESPONSIBLE POST IN DEVELOPMENT WORKS.** U.K. (not London). £1,600 p.a.

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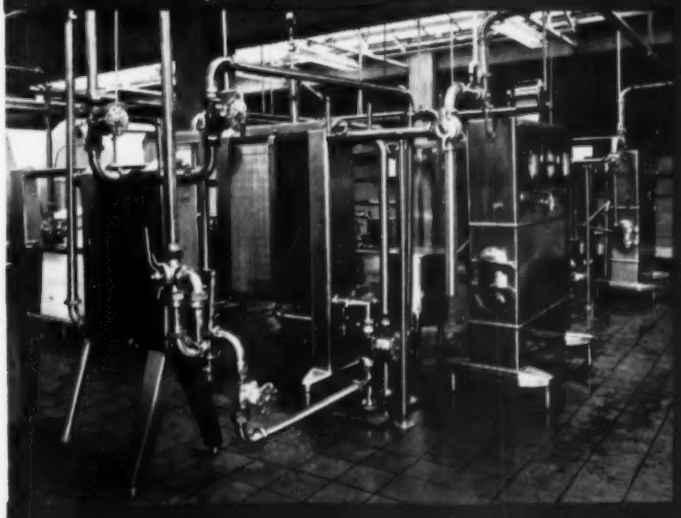
For the efficient processing and handling of potable liquids . . .

APV STAINLESS STEEL PLANT



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Universally recognised for its supremacy in the heating, cooling, pasteurising and sterilising of potable liquids. The Paraflow is extremely flexible. Its capacity can be varied and a number of duties can be performed within the same frame. All contact surfaces are in stainless steel and they are fully accessible for cleaning. Available in a wide range of sizes and frame types.

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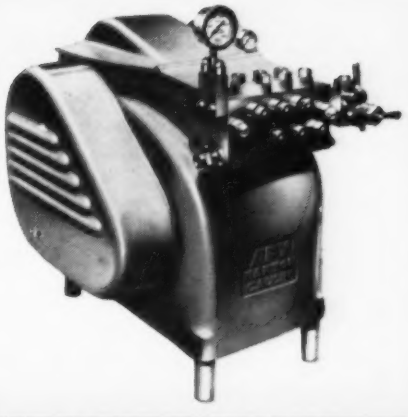

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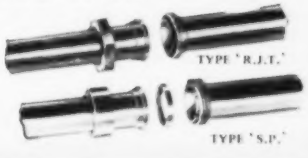

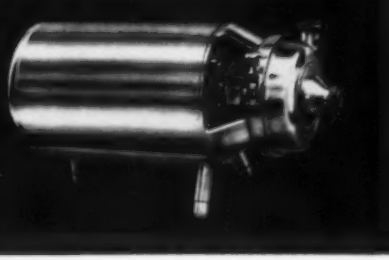

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